

## RAM set to expand its wireless reach

BY JOANIE WEXLER

Las Vegas

RAM Mobile Data will reveal at next week's Comdex/Fall 94 trade show a new phase of its business strategy intended to ensnare customers before Cellular Digital Packet Data technology gains a loyal user following.

Among the initiatives to be announced next week are partnerships with modem makers to embed RAM Mobile network interfaces into portable personal computers before they ship, a 50% network expansion over the next three years and delivery of an off-the-shelf

developers' kit to spur RAM Mobile-enabled applications.

The kit will contain modems, software interfaces and four months of free RAM Mobile airtime. Company officials said some developers could be on the air with applications in as few as two days.

Several makers of credit card-size modems, including AetherWorks Corp., this week will announce that they have already created PCMCIA cards based on a new Rockwell International Corp. chipset that supports RAM Mobile's Mobitex wireless protocol.

See RAM, page 70

## The word on wireless

Heavy hitters will come to bat at next month's PCS auctions. **Page 13.**

This week's special focus section separates fact from fiction concerning wireless data network services and emerging mobile net technologies. **Page 43.**

## Novell makes bid for UnixWare mind-share

BY KEVIN FOGARTY

Hilton Head Island, S.C.

"Take my desk,  
Take my server too,  
But I can't help running  
UnixWare 2."  
— Sung to the tune of "Can't  
Help Falling in Love"

Novell, Inc. last week brought analysts and the press to this resort community to informally announce Version 2.0 of UnixWare and try once

again to articulate how the operating system fits with its core NetWare product.

Despite the vocal talents of Novell and UnixWare Technology Group staffers — who serenaded attendees with Motown classics and an Elvis song mutated into a UnixWare product jingle — the briefing sessions were not always harmonious.

Analysts said Novell has failed to lay out a clear migration

See UnixWare, page 8

## Cisco to back SNA internet spec, with a twist

BY JIM DUFFY

San Jose, Calif.

Cisco Systems, Inc. this week will throw its considerable weight behind standards for IBM SNA internetworking when it announces support for Data Link Switching (DLSw) across its router line.

Cisco is expected to roll out DLS+, software that combines the company's proprietary Remote Source Route Bridging (RSRB) code with an implementation of the Internet Engineering Task Force's draft standard for DLSw. RSRB and DLSw, which was conceived by IBM, are both schemes for tunneling SNA and Network Basic I/O System traffic through IP nets.

DLS+ is intended to bring Cisco's

IBM internetworking technology more in line with the DLSw standard, which evolved from the IETF's Request For Comment 1434 and is expected to be ratified early next year.

Cisco will also unveil a frame relay assembler/disassembler (FRAD) in the form factor of its 2500 access router. The FRAD will support RFC 1490, which defines how multiprotocol traffic should flow over frame relay links and how devices can interoperate over a frame relay net.

Cisco confirmed that it will make an announcement this week but declined to provide further details.

The firm's support for DLSw indicates that the APPN Implementor's Workshop (AIW), which recently com-

### Where Cisco DLS+ goes beyond DLSw

- ✓ Support for source route bridging peer groups
- ✓ Prioritization of traffic
- ✓ NETBIOS name and Macintosh address caching
- ✓ LLC2-to-QLLC conversion
- ✓ QLLC-to-SDLC conversion

SOURCE: CISCO SYSTEMS, INC., SAN JOSE, CALIF. AND NETWORK WORLD

pleted work on the first DLSw version, has addressed some of the vendor's concerns with RFC 1434. Up to now, Cisco has refused to implement RFC 1434, claiming that the informational definition is missing key functions, such as management and flow control, and is technologically regressive.

See Cisco, page 70

## It's no secret: These agents need refining

BY JIM DUFFY

Users are increasingly relying on agent software to manage their networks and systems, but the distributed tools are not without implementation and interoperability shortcomings.

Traditionally the mute servants of the management console, agents are now taking on more platform-like functions — such as local polling, node discovery, event correlation and automated operations — in order to free up bandwidth and ease the job of managing bigger networks.

But placing more management responsibility on agents stirs up a whole host of issues: How many should run on a single system? What happens when a user polls a device with multiple agents? Which agent responds, and is it the right one? Are there standards for agents akin to those for management protocols? Can users buy agent software from someone other than their management platform provider? Can agents from multiple vendors interoperate?

"I see agents being sort of a double-edged sword," said Rick Sturm, a member of the technical staff at US WEST Advanced Technologies in Boulder, Colo. "They hold the potential of allowing us to accomplish more work on the device being managed. On the other hand, there is the risk that vendors can use the agent to implement a proprietary solution."

In the Simple Network Management Protocol world, agents respond to polls from SNMP consoles request-

See Agent, page 13

## Chasing reliability

Bank spares no expense in net overhaul.

BY MICHAEL CSENGER

New York

Dwarfing even New York's recent Lotto jackpot, The Chase Manhattan Bank, N.A. is paying out nearly \$100 million to overhaul its Manhattan trading floor as part of a two-year, \$200 million worldwide network upgrade.

These costs include everything from construction to furniture, but analysts estimate Chase will spend \$20 million for a network of intelligent hubs alone. The hubs are from Bay Networks, Inc. — the company formed out of the Wellfleet Communications, Inc./SynOptics, Inc. merger — which said the contract is the largest single hub deal in SynOptics' history.

Corporate approval for such a massive uplift "came down to the fact that we had to do it in order to grow the business and maintain a top market position," said Mark Baranovic, a vice president at Chase.

And this is just the beginning. When the hub rollout is finished next year, Chase will most likely start over again with smaller, localized

See Reliability, page 70



Chase's Bill Schmolzer makes no net compromises.



# Briefs

**HP In the center.** Hewlett-Packard Co. this week will announce Admin Center, software that automates change and configuration management of heterogeneous networked systems (NW, Aug. 15, page 1). The software will run with or without HP's OperationsCenter systems management application for its OpenView platform. Pricing will start at about \$15,800. HP declined to comment.

**Middleware movement.** IBM this week will add to its MQSeries middleware the ability to communicate with MVS mainframes via TCP/IP, whereas previously MQSeries needed to use Systems Network Architecture for MVS connectivity. IBM will also announce plans to port MQSeries to several new platforms: AT&T Global Information Solutions' Unix, Sun Microsystems, Inc.'s Solaris/2 and Tandem Computers, Inc.'s Himalaya. In addition, Big Blue is set to offer an enhanced level of MQSeries on AIX and OS/2, including the ability to use Windows clients. Finally, the company will rebrand Systems Strategies, Inc.'s and Apertus Technologies, Inc.'s ezBridge products as IBM products. All of the new offerings will be available by mid-1995. Pricing was not announced.

In a related announcement, Apertus will unveil a Simple Network Management Protocol-based administration tool for MQSeries.

**ATM in the aisles.** JCPenney Company, Inc. last week said it is launching a technical trial to determine how applicable combining voice, data and video over high-speed Asynchronous Transfer Mode links is to the retail industry. The company has teamed with carriers AT&T and Southwestern Bell Telephone Co. for the services portion of the network, which will carry images of JCPenney merchandise among three corporate sites. Running at 155M bit/sec, the public nets will transport ATM cells that have been converted from Fiber Distributed Data Interface LAN frames by Cisco Systems, Inc. 7000 routers. The trial is set to begin Feb. 1 and run for 45 days.

**Ringmasters.** Leading token-ring vendors today will unite in an effort to champion emerging high-performance token-ring standards and to educate customers on the technology. Goals of the Alliance for Strategic Token Ring Advancement & Leadership (ASTRAL) also include supporting the rapid adoption of new token-ring standards and helping users understand migration options, such as Asynchronous Transfer Mode, LAN emulation and token-ring switching. Founding members include IBM and Bay Networks, Inc.

ASTRAL: (415) 328-5555.

**Multimedia patent: one year later.** A year ago, a multimedia publishing company shocked the hordes attending the Comdex trade show by announcing it had patented what many considered to be universal search and retrieval technology. Last week, the U.S. Patent and Trade Office took the unusual step of reversing itself and rejecting the patent claim of Compton's New Media, saying the technology predated the claim and as "prior art" could not belong to one company.

"It would have affected everyone from CD-ROM publishers to authoring tool developers to AT&T being involved in the Superhighway to people putting information on Web servers on the Internet," said one analyst.

**Token appearance.** Cabletron Systems, Inc. this week will announce a new token-ring stackable hub with support for IBM's Systems Network Architecture. Further details were not available.

**Btrieve getting Blue.** Novell, Inc. database spin-off Btrieve Technologies, Inc. is expected to announce in the next few weeks that it is rolling out versions of its Btrieve database for IBM's OS/2 Warp and LAN Server operating systems. Btrieve which is available as a stand-alone product or bundled with NetWare, is widely used for file management in NetWare-based networks.

**Making the Gradient.** Gradient Technologies, Inc. of Marlborough, Mass. last week said it will deliver a 32 bit Windows NT version of the Open Software Foundation Inc.'s Distributed Computing Environment in the second quarter of next year. The company said the software will let users employ Windows NT systems as DCE servers or clients.

For details on how to reach us, see page 71.

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## Network **HELP** desk

Network World tracks down answers to your questions regarding products, services, technologies or disputes with vendors. Please submit questions to Dana Thorat at (800) 622-1108, via fax at (508) 820-1103 or (508) 820-3467, via the Internet at [djt@world.std.com](mailto:djt@world.std.com) or via CompuServe at 73244,2673.

Our company has a RISC System/6000 machine on which a Sybase, Inc. SQL database server resides. We are also running Novell, Inc.'s Unix connectivity product, LANWorkplace for DOS, for database access.

On several workstations, we have Stac Electronics' disk compression utility, Stacker Version 3.5. However, when we try to access the database server from one of these workstations using Microsoft Corp.'s Excel or KnowledgeWare, Inc.'s Objectview, we get error messages such as "Cannot find NETAPI.DLL" and "Cannot find WLBSOCK.DLL" and are not able to access the Sybase server. Do you know what might be the problem?

Ashok Kumar, Los Angeles

William Welch, a technical support representative at Corporate Software, Inc., a PC software products, support and systems integration company

based in Norwood, Mass., replies:

Novell has issued several enhancements to LAN Workplace for DOS that just might solve your problem. The patch files are available on CompuServe's NetWire in the Novell Library, NOVLIB, in Data Library 8. If you are using LAN Workplace for DOS Version 4.0, download the file LP401A.EXE. For Version 4.1 or 4.2, download LPW209.EXE, LPW208.EXE and LPW207.EXE.

I recently discovered that the existing wiring for our LAN did not conform to any particular standards. Where can I get information on the standards that govern network wiring?

Mike Saterfield, Bloomington, Ind.

Arthur Bleiwas, an independent network consultant in Cliffside Park, N.J., replies:

The primary source for standards governing computer network wiring is the Electronics Industry Association (EIA) in Washington, D.C. The EIA publishes six documents that cover topics such as wiring layout, connecting hardware, wire specifications (such as those defining Category 5 twisted pair) and even guidelines for the administration of cable. See Helpdesk, page 56.





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September 6, 1993

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# VPNs go across the pond

MCI launches international virtual network service.

BY BILL BURCH

Washington, D.C.

BT and MCI Communications Corp. last week tried to get their Concert joint venture off the ground with the launch of an international virtual network service, but without any customers to showcase, the announcement sounded a bit hollow.

MCI is close to signing up Allied Van Lines, Inc. in Naperville, Ill., but the mover hasn't yet inked a deal for the service, according to Julie MoDrak, the company's director of communications and information center services.

BT and MCI's new service broadens the coverage offered by current virtual services — which allow users to call from the U.S. to other

countries — by allowing users to phone between foreign countries.

Across the industry, getting the new international virtual network services up and running appears to be giving carriers a tough time. But with many sales efforts already under way, carriers are pressing ahead with announcements despite being only partially prepared.

The carriers are counting on virtual network offerings to lure users away from international direct-dial service with lower rates and advanced features. For example, companies can use abbreviated dialing plans to reach on-net locations, plus take advantage of a single-

carrier point of contact for network maintenance.

Other advantages of international virtual network services include advanced billing, with a single unified statement that can break out calling by site and provide charges in various currency denominations.

However, those same advanced features that add to the service's allure appear to be giving carriers problems. Sprint Corp. has yet to implement unified billing and billing in different currencies, despite having announced those features last month. Meanwhile, problems with BT's virtual net technology have forced Concert to rely on MCI's platform, industry sources said.

**For customers, one of the service's main advantages will be the ability to call multiple countries. The Big Three long-distance carriers today only support virtual net services between pairs of countries.**

## IN CONCERT

MCI and BT originally introduced plans for Concert this summer, and a service launch this month would let the team beat AT&T to market. AT&T plans to launch its World-source virtual network service in the first quarter of next year.

MCI's announcement this week covers virtual net service in eight countries: Australia, Belgium, France, Germany, the Netherlands, Sweden, the U.K. and the U.S. Between them, these countries represent 80% of all corporate voice traffic for U.S. multinationals, MCI said.

For customers, one of the service's main advantages will be the ability to call multiple countries. The Big Three long-distance carriers today only support virtual net services between pairs of countries.

Sprint, for example, announced virtual service between the U.K. and the U.S. last month. The carrier plans to widen coverage to provide service throughout Europe and the Asia-Pacific via its planned alliance with France Telecom and Deutsche Telekom but can't commit to a firm date for the service, according to Ned Feldman, director of international corporate voice product management for Sprint International.

For some companies, virtual private network service to individual countries may go a long way toward meeting their requirements. In the U.K., Ernst & Young spends roughly 45% of its international calling dollars on calls to the U.S.

By switching from international direct dial with BT and Mercury Communications, Ltd. to Virtual Private Network service with Sprint, Ernst & Young saved 25% on those calls, according to John Neal, senior manager for U.K. telecommunications systems at the company in London.

"We really took a big bite out of the cherry in one go," Neal said. "Now we're looking at the rest of our top 20 countries in terms of cost, and we're very keen to get those signed up with Sprint, as well." □

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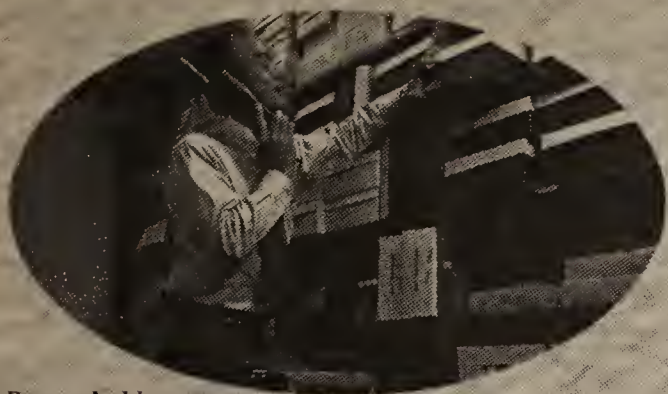
# expectation.

IBM

## CORRECTION

A wrong Uniform Resource Locator (URL) was provided for Trade Point USA's World Wide Web server (Oct. 31 page 17). The correct URL is <http://natp.ifta.com/natp.html>.



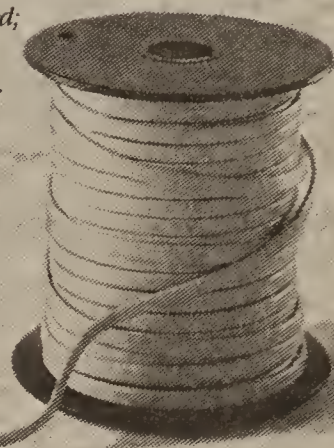


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# Low-end router/hub market gets some new additions

BY MARGARET DORNBUSCH

Users will get to choose from another batch of hub and router wares geared to branch offices, following the latest wave of announcements last week by Chipcom Corp., Hewlett-Packard Co. and Proteon, Inc.

Chipcom's LAN Access Server and Edge Router, as well as Proteon's RBX 200 router, are intended to connect remote offices to corporate LANs, while HP's HP AdvanceStack 10Base-T Hub-8U offers an entry-

level, lower price hub.

Chipcom's LAN Access Server is a remote access server integrated within a hub. It comes in 8- and 16-port versions and supports all WAN communications methods, including asynchronous, synchronous, ISDN and switched 56K bit/sec services.

The module supports all popular networking operating systems and can be controlled with Chipcom's ONdemand suite of graphical management tools or any Simple Network Management Protocol-based local or remote management console.

The Edge Router operates at the outskirts of a corporate network, whether at a remote office or the far reaches of a central facility. The module connects two or more LANs with up to three redundant links to ensure fail-safe network availability.

The module, jointly developed by Chipcom and Cisco Systems, Inc., supports both synchronous and asynchronous routing over serial links and integrates Cisco's set of multiprotocol routing capabilities with Chipcom's port-switching architecture.

Both the hub and the router support Chipcom's OpenHub technology, which allows them to work in any Chipcom hub. Initially, Ethernet versions will be available, with token-ring versions set for the first-quarter 1995.

The HP AdvanceStack 10Base-T Hub-8U is an eight-port unmanaged hub that can be

See Additions, page 8

# DCE 1.1 debuts; now awaits vendor support

BY ADAM GAFFIN

Newton, Mass.

The new Distributed Computing Environment (DCE) specifications released last week will make it easier to build robust distributed applications, but users said the technology will have little impact on their networks until application and development tool vendors support it.

Until now, implementation of Open Software Foundation, Inc. DCE technology has been limited mainly to operating system software, meaning users have had to build their own DCE applications to utilize the technology.

DCE consists of directory, security, remote procedure call (RPC) and other client/server-based services designed to run across heterogeneous networks.

At an OSF DCE user conference held here last week, users said they are looking forward to products supporting Version 1.1, which features enhanced security and simplified administration capabilities. Products are expected by early next year.

Charles Blauner, lead security consultant for Bell Communications Research in Piscataway, N.J., said some of those new DCE-compliant products better be applications and databases.

Bellcore has not had problems developing DCE-based applications to monitor telecommunications networks but would rather buy off-the-shelf software in other areas, such as payroll and accounting, Blauner said.

Right now users typically have to take it upon themselves to bind DCE services to their applications — no easy task, given that DCE comes with several hundred program calls.

Michael Guidry, technical advisor for architecture and technology at Phillips Petroleum Co. of Bartlesville, Okla., said the company would like to buy commercially available DCE-enabled data access applications. Instead, Phillips is looking at some extensive retraining of COBOL and CICS programmers so they can write DCE-based applications, he said.

Some vendors are beginning to respond. Hewlett-Packard Co., for example, this

summer released a series of C++ class libraries that bundle related DCE program calls into simple statements that can then be used with an object-oriented development tool kit. Open Environment Corp., based in Cambridge, Mass., also supports DCE in its Encompass tool kit.

Separately, Dynasty Technologies, Inc. plans to provide DCE support in a new version of its Dynasty Development tool set, due out in the first quarter, while Unify Corp. plans to add DCE RPC support in the next release of its Vision tool kit, also due in the first quarter.

## REAL-WORLD EXPERIENCE

Despite DCE's shortcomings in terms of vendor support, some users are taking advantage of DCE's capabilities on their own.

ITT Hartford set up a DCE-based directory of user names and network resources about six months ago, counting on DCE to simplify logons for end users and ease administration for managers. Initial tests have been positive, said G. Michael Gagnon, senior system specialist in the technical infrastructure support department.

ITT Hartford will even better able to take advantage of DCE services once the company's departments can start building their own applications — but they will require graphical fourth-generation language tools, Gagnon said.

Bellcore is also experiencing the benefits of DCE. The regional Bell holding company affiliate is able to provide a common set of network services across the RBHCs' vast mix of computing platforms and operating systems, Blauner said.

Being able to maintain just one set of code "makes my job a hell of a lot easier," he said.

3M, based in St. Paul, Minn., is currently building a prototype inventory management application using DCE and evaluating its use through-

out the enterprise.

William Estrem, 3M's project leader for information architecture, said the company is looking for DCE to provide common back-end services across a heterogeneous network of HP, Digital Equipment Corp., IBM and Microsoft Corp. computing platforms. Key to that are DCE's security services, which will let the company give end users a single logon for accessing applications and servers across the network. □

## OSF promises to add DCE to Web

The Open Software Foundation, Inc. is working to integrate its Distributed Computing Environment with the World-Wide Web (WWW).

The goal of a pilot test unveiled last week is to mesh DCE's security and remote procedure call (RPC) with the WWW's information dissemination abilities via DCE-enabled WWW servers and clients.

This would allow for secure servers and transactions, and would give users WWW access to back-end applications via DCE's RPC, said Ira Goldstein, an OSF vice president.

The work is not only the latest example of the speed with which WWW is becoming a major tool for the distribution of information, but also an indication of an impending problem of incompatible WWW security systems.

The WWW comprises clients and servers connected via the HyperText Transport Protocol (HTTP), which is based on TCP/IP. HTTP lets WWW developers build links to documents and multimedia files stored anywhere on a TCP/IP net, such as the Internet.

HTTP does not have any built-in security components for such tasks as credit card transactions or specifying who has access to which fields in a database.

DCE's security service, based on Kerberos, allows for authentication and encryption. Its access control lists let administrators define security levels for individual objects in a compound document, such as a WWW page, Goldstein said. This would let a company use a single server for both private and public applications.

OSF hopes to have specs for a DCE/WWW server out by March and for a DCE/WWW client out by June, according to Goldstein.

BY ADAM GAFFIN

## New NW columnists

Rounding out the largest collection of regular columnists in the industry, *Network World* this week is adding new opinion columnists to its Enterprise Internetworks and Client/Server Applications sections.

**Marc Myers**, president of Client/Server Connection, Ltd. and an expert on client/server issues, will alternate with **Mike Rothman**, a META Group director, who focuses on electronic messaging and groupware. Look for Myers' first column on page 39.

New to the Enterprise Internetworks section is **Dan Minoli**, a principal consultant at DVI Communications, Inc., a New York consultancy, where he specializes in the deployment of technologies such as ATM networks, multimedia, imaging and video. The author of 20 books on computers and communications, Minoli has his column on page 20. He will alternate each week with Scott Bradner, who's column has appeared in *NW* for nearly two years.

*NW* strives to bring you not only the latest breaking industry news, but also insightful analysis by some of the most provocative thinkers in the business. Let us know what you think of our latest additions (see contacts box on page 71).

## Breaking through the Notes Express application barrier

BY ADAM GAFFIN

Cambridge, Mass.

Lotus Development Corp.'s Notes Express client has been criticized for its inability to access existing Notes databases, but a tool vendor here says it has found a way to link the two.

Brainstorm Technologies, Inc. is taking advantage of the fact that Notes Express and regular Notes share the same application program interface (API) to offer a Visual Basic tool kit through which Notes Express applications can be linked to back-end Notes databases.

Brainstorm's VB/Link and a new, lower cost VB/Link Desktop released last week consist of Visual Basic Controls (VBX) that bundle related API calls into simple commands a Visual Basic programmer can use to build Notes applications.

When it launched Notes Express in September, Lotus mentioned the shared API, but that was lost amid complaints about the restrictive Notes Express license, which limited users to electronic mail and four other applications bundled with the Notes Express client (*NW*, Sept. 19, page 5).

Mitchell Liu, chief technology officer at Brainstorm, said users that employ VB/Link to build Express applications capable of retrieving data from Notes databases are not bound by the licensing restrictions because the applications are actually Visual Basic applications.

VB/Link, which includes VBXs for linking clients and servers, has been available for several months. VB/Link Desktop is limited to designing applications

See Barrier, page 8

**When it launched Notes Express, Lotus mentioned the shared API, but that was lost amid complaints about the restrictive Notes Express license.**

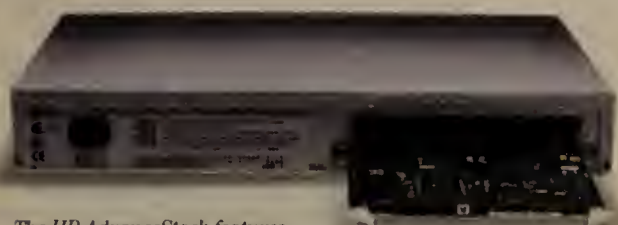


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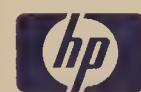
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# What's new in UnixWare 2.0

Novell, Inc. will roll out in December an updated version of its UnixWare operating system that includes symmetric multiprocessing and multithreading capabilities, as well as improved installation, management and security features. It will also offer a single logon to both NetWare and UnixWare services.

Novell, which had originally said it would roll out UnixWare 2.0 this summer and then rescheduled it for November, will begin shipping it in late December. The product will then be formally introduced amidst other NetWare and GroupWare announcements in January.

The product will be able to run without modification on a two-processor symmetric multiprocessing server when it is delivered. Users will be able to buy add-on software modules to let it run on as many as eight processors at once.

It will also support multithreaded applications, which improve performance on SMP systems. An updated version of the software development kit includes multithreading application program interfaces (API) for application developers writing to the operating system.

UnixWare 2.0 is designed as a series of dynamically loadable modules (DLM), segments of code such as device drivers, which load when they are needed and then close to preserve memory. It will also include the following:

- Interfaces that let an application asynchronously initiate I/O requests to another application, then go on to another while waiting for a response.

- An easy-install utility available on CD-ROM or tape that simplifies configuration and installation of local or remote servers.

- A graphical interface that lets administrators add and remove user accounts, change passwords, backup and restore files, schedule tasks, monitor system performance, and handle other functions by dragging and dropping items.

It also includes automounting for NetWare file systems, support for IPX routing, access to both UnixWare and NetWare printers, access to NetWare electronic mail via the MHS protocol and TCP/IP support.

BY KEVIN FOGARTY

## UnixWare

Continued from page 1

tion path to UnixWare, has not clarified its stance on application development technologies, and needs to kick its marketing efforts into high gear if UnixWare is to be successful against Windows NT and the marketing machine of Microsoft Corp.

Robert Frankenberg, Novell president and chief executive officer, took the lead at the event, positioning UnixWare as the server of choice for client/server applications in NetWare and non-NetWare environments. That is a concession by Novell, which had earlier pitched UnixWare as a client operating system, that Microsoft has won the war for the desktop and that NetWare is not cut out to host distributed applications.

UnixWare 2.0 — which was often discussed at the meeting, although not officially announced — is an interim step in the integration of UnixWare and NetWare, a project that will result in a future operating system the company refers to as SuperNOS. SuperNOS will include NetWare's network services and the power of Unix as an application server, said Mike DeFazio, executive vice president and general manager of Novell's Unix Systems Group.

UnixWare 2.0 contains some important new features and Novell claims it is the application server performance leader. "It's an animal," said Rick Bohdanowicz, vice president of marketing for Unix Systems Group.

But selling the UnixWare concept to customers, not performance, is the key issue, according to analysts. Novell needs to communicate the advantages of UnixWare: that it uses existing Unix tools and programming expertise, runs high-powered applications on relatively inexpensive Intel Corp. platforms and integrates tightly with existing NetWare services.

And the company needs to convince users soon. SuperNOS' 1996 delivery date gives Microsoft two years to build a user base for Windows NT, which

includes many of the features slated for the SuperNOS.

"Right now, they're selling two application servers — UnixWare and NetWare," said Scott Winkler, an analyst at Gartner Group, Inc. in Stamford, Conn. "If they were to say that UnixWare is the migration strategy for [NetWare Loadable Module applications], they would have something. But they're not saying that."

Novell officials were reluctant to describe UnixWare applications as an upgrade to NLMs, although they indicated that most new applications are better off targeted to UnixWare. Databases are a sticky issue, with Novell saying database NLMs remain a solid solution for applications where most logic resides on the client.

Michael Goulde, an analyst at the Boston-based Patricia Seybold Group, Inc., said Novell "has to out-Microsoft Microsoft" in marketing UnixWare. "Novell has to be out there telling people UnixWare is the road to SuperNOS, and they're not," he said.

"We've done an incredibly poor job of marketing, and there have been some bumbled efforts," DeFazio acknowledged. "We have to overcome that."

Novell will, among other things, launch a huge ad campaign and try to expand UnixWare's sales channels through relationships with resellers that have traditionally sold Unix products, not NetWare.

Novell has also lined up big backers, such as Compaq Computer Corp., Intel Corp., Sybase, Inc. and Oracle Corp., whose executives voiced support for UnixWare 2.0. But they agreed that Novell will have to handle the heavy work of creating demand.

Analysts are also concerned about Novell's plans for providing UnixWare development tools. UnixWare will support Microsoft's Object Linking and Embedding and Computer Integration Laboratory, Inc.'s OpenDoc, but Novell has not said much more than that nor has it tabbed a specific object development environment. DeFazio said Novell will announce its object strategy early next year. □

## Barrier

Continued from page 6

for client Notes databases. However, these databases can then exchange data, via Notes replication, with servers, typically over dial-up lines.

Users lose the Notes interface and its views, but that is not necessarily a bad thing, because the general Notes interface is so different from that in other Windows applications, said Ajay Khanna, president of Corporate Power, Inc., a White Plains, N.Y., Notes consultancy.

Corporate Power is currently using VB/Link Desktop to build a Notes Express-based application for a client in the financial industry that could be rolled out to several thousand users, Khanna said.

In the application, remote salespeople would be given Notes Express clients and a specialized database to track and update customers' financial portfolios.

VB/Link prices start at \$695 per license. VB/Link Desktop starts at \$149 per license. There are no runtime fees for applications developed with the tools.

©Brainstorm: (617) 492-3399.

### Hub and router roundup

Product	Pricing	Availability
Chipcom's LAN Access Server	Starts at \$4,495	December
Chipcom's Edge Router	\$4,295	December
HP's AdvanceStack 10Base-T Hub-8U	\$299	December
Proteon's RBX 200	\$1,990	Now

GRAPHIC BY TIMOTHY HILL

## Additions

Continued from page 6

upgraded to support SNMP management. The hub features RJ-45 connectors and one recessed transceiver slot for attaching an optional fiber, unshielded twisted-pair or coaxial transceiver module for connection to a network backbone.

An optional Distributed Management Module allows a user to connect the hub to another AdvanceStack hub and use its SNMP management features, if that hub is equipped with an SNMP module.

Proteon's RBX 200 remote access router series supports Systems Network Architecture and traditional LAN protocols. The router initially is available with two WAN ports and a single Ethernet or token-ring connection.

ISDN versions will be available in early 1995. The systems come with 4M bytes of dynamic random access memory and 2M bytes of flash memory with an 8M/4M-byte option.

The router, developed jointly with IBM's Networking Systems Division, comes preloaded with IP Services/Universal Bridge software, which provides IP routing and route management. Multiprotocol services or SNA internetworking packages can be added, as well.

Standard SNMP support allows the RBX 200 to be centrally managed and controlled by HP OpenView, NetView/6000 or other SNMP managers. Universal bridging enables any end station to talk with any other end station. If a branch office experiences a sudden power outage, the RBX 200 automatically recovers by booting from its own flash memory.

The biggest advantage of the RBX 200 is its price/performance ratio, said Perry Verrino, manager of computer data for Rayonier, Inc. in Stamford, Conn., who has been evaluating the router.

"We can now afford to put routers in smaller, two- to three-person offices," Verrino said.

In addition, the router's software is consistent with the other Proteon routers in his network, so no staff retraining is required. □

## Novell's Unix leader speaks out

Answers to some pointed questions from Mike DeFazio, executive vice president and general manager of Novell, Inc.'s Unix Systems Group

**If I'm a NetWare customer, what are the advantages of UnixWare as my applications server?**

First, Unix has an enterprise-proven robustness. It's being used in the enterprise — people are running line-of-business applications on Unix right now. Second, you get [good price/performance] running UnixWare on industry standard Intel servers. And finally, you get the tight integration with NetWare — at the user, application programming, interface, management and administration levels.

**One key to getting UnixWare installed**

**as the application server of choice is providing strong development tools. What is your strategy there?**

We'll leverage existing tools where we can and then build on them. One key initiative is the Visual AppBuilder.

**What is Novell's object strategy?**

We haven't announced that strategy. We have said we will support [Object Linking and Embedding] and OpenDoc, but we have to make sure the platform can manage and store objects and provide for application-to-application connectivity.

We have to select from existing technologies and augment them to provide what people really need. Taligent [Inc.] is doing well with a piece; Next Computer, Inc. is, as well. No one environment does it all. We hope to lay out which technologies we will

support early next year.

**You've talked about the emergence of the SuperNOS. Do you envision a day when you will stop selling NetWare?**

NetWare could go on forever. We are not going to limit its growth. We'll let the market decide.

**Your SuperNOS strategy implies that at some point people should stop buying and developing NetWare Loadable Modules (NLM).**

We encourage people to develop applications on application servers, the best of which we believe is UnixWare. Databases are a unique case. We aren't encouraging users to move a database NLM to UnixWare unless they run out of capacity on NetWare or have some other concern.



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# Newbridge and InSoft team on ATM-based videoconferencing

*Vendors have plans to address interoperability issues.*

BY MICHAEL CSENGER

Kanata, Ontario

Newbridge Networks Corp. and InSoft, Inc. last week announced a joint development agreement that will pave the way for ATM-based videoconferencing.

InSoft markets desktop conferencing and collaborative computing software called Communicate, while Newbridge's Vivid product line — still under development — is focused on integrating Asynchronous Transfer Mode with traditional LAN technologies.

According to InSoft, the company's recently announced Open Digital Video Everywhere (OpenDVE) is the only application program interface that can support videoconferencing across different transport protocols using a variety of video standards. Together, Newbridge and InSoft will enable users to conduct videoconferences not only over ATM, but also among multiprotocol networks consisting of Ethernet, ISDN, frame relay or other links.

"In the data world, this type of interoperability is assumed," said Rick Tinsley, Newbridge's director of product marketing for

Vivid. "One of the main points of ATM has been to support that kind of transparent interworking."

But videoconferencing traffic entails a much different set of interoperability issues, none of which have been resolved through standards.

"For those of us who aren't deep into the mystique of videoconferencing, you'd think [it could run between all kinds of services]," said Jennifer Pigg, director of data communications research at The Yankee Group, a Boston-based consultancy. "But it [cannot]."

Current multipoint videoconferencing systems require a centralized control point using  
*See Video, page 12*

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**IBM expects to ship more than 80% of its software electronically by the end of 1995. The company sells more than \$11 billion of software every year, including products from hundreds of third-party vendors.**



## IBM to beam up satellite-based software delivery

BY MICHAEL COONEY

Germantown, Md.

IBM is looking to forever change the face of enterprise software distribution.

The company last week teamed up with Hughes Network Systems to offer a satellite system that will let corporate users order and receive systems software over a high-speed satellite network. This is part of Big Blue's grand plan for eliminating the more costly and less expedient method of shipping floppies and tapes via mail or overnight delivery services.

The new system also promises to deliver software updates or emergency fixes instantly, rather than making customers wait hours or days for crucial updates.

The Hughes agreement is but one new way IBM is looking to alter its software distribution methods. At the recent NetWorld+Interop show in Paris, company executives said they would be exploring ways to deliver software electronically over the Internet and through its own Global Network.

"We are trying to get users to think differently about how they have their software delivered," said Kathleen Kincaid, director of IBM's SystemView marketing. "With Karat [management products], for example, users will choose from a menu of applications, and we will ship those applications as a single integrated entity on a CD-ROM or electronically. These are things we've never done before."

According to IBM, none of the third-party vendors whose software Big Blue sells have signed up to use the Hughes system, though pilot projects are under way.

"The days of distributing software one product at a time on tape are dead," said Anura Guruge, an independent analyst based in New Ipswich, N.H. "IBM is the largest software  
*See IBM, page 13*

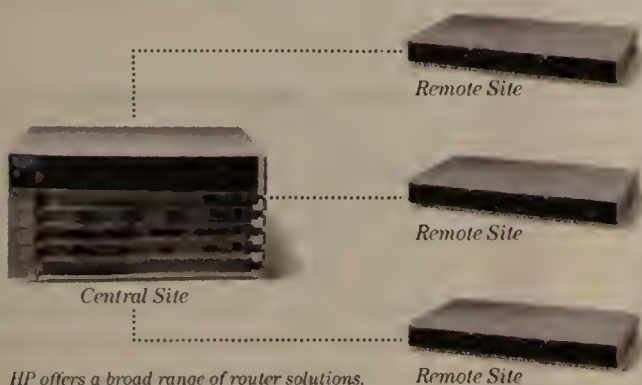


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- HP OpenView-based management tools to keep internal support costs to a minimum (with choice of Windows, NT, or UNIX® platforms)
- Bandwidth management features like data compression, protocol prioritization, bandwidth reservation and latency control to help you get the most out of your WAN connections
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# Vendors of complex query databases form consortium

BY BARB COLE

A handful of vendors that sell specialized databases for building executive information systems (EIS) are uniting to face off against database giants Oracle Corp., Sybase, Inc. and Informix Software, Inc.

The consortium, dubbed the On-Line Ana-

lytical Processing (OLAP) Council, will work to differentiate its members' products in customers' minds from relational databases. OLAP vendors face the threat of traditional relational databases evolving to handle the complex queries for which EIS systems were designed to accommodate, analysts said.

OLAP products are designed to handle

complex queries across a net either in conjunction with an existing relational database or as a separate database. Because OLAP systems store data in a more flexible format than do relational databases, they can perform complex calculations faster and handle more data.

Members of the OLAP Council, including Arbor Software, Inc. and Comshare, Inc., declined to comment on the group's plans, which will be revealed later this month.

But officials from some member firms said OLAP system vendors need to band together so as not to get squashed by the larger, traditional database vendors.

"The relational database vendors recognize the need to give people the ability to do robust calculations and process fast queries," said Kirk Cruikshank, vice president of marketing at Sunnyvale, Calif.-based Arbor Software.

Database vendors could make their products better suited for OLAP applications by adding extensions to SQL, the language on which they are based, and by boosting support for larger amounts of data, said Peter Kastner, an analyst at Aberdeen Group, Inc. in Boston.

But the relational database leaders are making moves. Oracle is reportedly adding SQL extensions to support OLAP to its Oracle7 database, but it declined to comment.

Sybase last week acquired technology to speed up queries run against large databases (see story, page 35). And Informix last week said it is working with computer maker Cray Research, Inc. to port the Informix On-Line 7.10 database to Cray's CS6400 symmetric multiprocessor computer to support databases including hundreds of gigabytes of data.

Users said relational database companies should provide products flexible enough to use in OLAP applications.

"We're moving away from the constraints that you have to store character-based data in 25-character segments in relational databases," said Dave Malone, a systems integrator at Canadian Utilities Services in Edmonton, Alberta. □

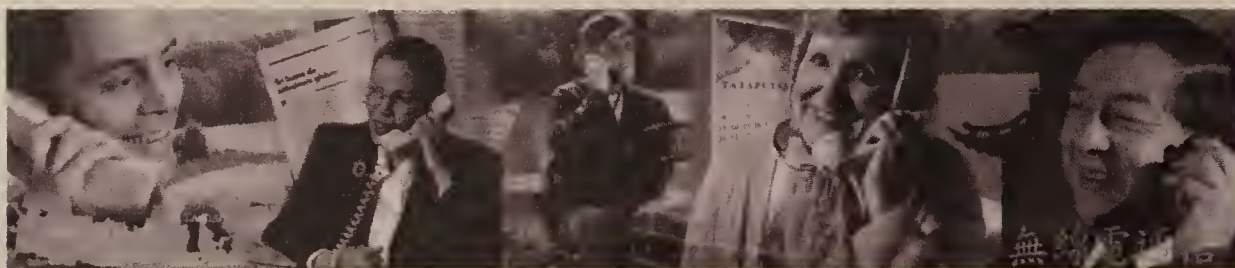
## The OLAP Council

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## Video

*Continued from page 10*

a multipoint control unit (MCU) and racks of other equipment, said Richard Doherty, director of The Envisioneering Group, a multimedia test lab and consultancy in Seaford, N.Y.

"[Handling] more than three or four parties in a wide-area distance-learning application becomes very expensive," he said. "And when you get into different packet formats and video protocols, an MCU won't work at all."

Under the Newbridge-InSoft partnership, the Vivid equipment would handle interworking of different transport protocols, while OpenDVE would handle all of the control processes and gateway functions supporting the video content.

"This is a capability AT&T might be able to bolt onto its WorldWorks [service] in a year, while Newbridge and InSoft already demonstrated the capability in Paris last week," Doherty said.

### OPEN RELATIONSHIP

When Newbridge introduces Vivid Ridge and Route Server — two key components of its Vivid product line — early next year, the products will support videoconferencing via LAN emulation at no extra charge. Newbridge will optimize its Vivid network interface cards to support Communique's packet-based videoconferencing at this time.

By mid-1995, InSoft will add native ATM support to Communique.

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Business Phone (\_\_\_\_\_) \_\_\_\_\_

Business FAX (\_\_\_\_\_) \_\_\_\_\_

## 1 Industry: (check one only)

- |  |  |
|--|--|
| 01 <input type="checkbox"/> Manufacturers (other)  | 12 <input type="checkbox"/> Government Federal/State/Local                                     |
| 02 <input type="checkbox"/> Finance/Banking  | 13 <input type="checkbox"/> Military   |
| 03 <input type="checkbox"/> Insurance/Real Estate/Legal  | 14 <input type="checkbox"/> Aerospace  |
| 04 <input type="checkbox"/> Healthcare Services  | 15 <input type="checkbox"/> Consultants (Independent)  |
| 05 <input type="checkbox"/> Hospitality/Entertainment/ Recreation  | 16 <input type="checkbox"/> Carriers/Interconnects   |
| 06 <input type="checkbox"/> Media/TV/Cable/Radio/Print   | 17 <input type="checkbox"/> Manufacturers (Computer/ Communications)                           |
| 07 <input type="checkbox"/> Retail/Wholesale Trade/Business Services   | 18 <input type="checkbox"/> Systems/Network Integrators (VAR/VAD/ VAN/Systems/Software Houses) |
| 08 <input type="checkbox"/> Transportation   | 19 <input type="checkbox"/> Distributors Communications/ Computers                             |
| 09 <input type="checkbox"/> Utilities  | 20 <input type="checkbox"/> Other _____  |
| 10 <input type="checkbox"/> Education  |  |
| 11 <input type="checkbox"/> Process Industries (Mining/Construction/ Petroleum Refining/ Agriculture/Forestry) |  |

## 2 What is your Job Function? (check one only)

### NETWORK IS Management:

- |   |   |
|---|---|
| 1 <input type="checkbox"/> Networking Management        | 6 <input type="checkbox"/> Corporate Management (CIO,CEO,PRES,VP, DIR,MGR,Financial Management) |
| 2 <input type="checkbox"/> LAN Management               | 7 <input type="checkbox"/> Consultant (Independent)   |
| 3 <input type="checkbox"/> Datacom/Telecom Management   | 8 <input type="checkbox"/> Other _____  |
| 4 <input type="checkbox"/> IS,IT,MIS,Systems Management |   |
| 5 <input type="checkbox"/> Engineering Management       |   |

## 3 What is the total number of sites for which you have purchase influence? (check one only)

- |                                    |                                    |                                  |                                 |
|------------------------------------|------------------------------------|----------------------------------|---------------------------------|
| 1 <input type="checkbox"/> 100+    | 3 <input type="checkbox"/> 20 - 49 | 5 <input type="checkbox"/> 2 - 9 | 7 <input type="checkbox"/> None |
| 2 <input type="checkbox"/> 59 - 99 | 4 <input type="checkbox"/> 10 - 19 | 6 <input type="checkbox"/> 1     |                                 |

## 4 What is your scope and involvement in purchasing decisions for network products & services for your enterprise?

### A. SCOPE (check one only)

- 1 ☐ Corporatwide  
2 ☐ Multienterprise  
3 ☐ Departmental  
4 ☐ None

### B. INVOLVEMENT (check all that apply)

- 1 ☐ Recommend/Specify  
2 ☐ Approve  
3 ☐ Evaluate  
4 ☐ Determine the need  
5 ☐ None

## 5 Check ALL that apply in columns A and B:

- A:** I am involved in the purchase of the following products/services.  
**B:** I plan to purchase the following products/services.

- A** ☐ 100 **B** ☐ **LOCAL AREA NETWORKS**
- ☐ 01 ☐ Local Area Networks
- ☐ 02 ☐ Network Operating Systems Software (NOS)
- ☐ 03 ☐ LAN Storage Devices (optical, tape, disk, etc.)
- ☐ 04 ☐ LAN Backup Systems (optical, tape, disk, etc.)
- ☐ 05 ☐ Network Test Equipment/Diagnostic/ Management Software
- ☐ 06 ☐ Hubs/Intelligent Hubs
- ☐ 07 ☐ Cables, Connectors, Baluns
- ☐ 08 ☐ UPS
- ☐ 09 ☐ Network Adapter Boards/Network Interface Cards
- ☐ 10 ☐ Peer-to-Peer LANs
- ☐ 11 ☐ Wireless Networks
- ☐ 12 ☐ SNMP Network Management
- ☐ 13 ☐ ATM Switches
- ☐ 14 ☐ Remote LAN Access
- ☐ 15 ☐ Ethernet Switches
- ☐ 16 ☐ LAN Servers
- ☐ 17 ☐ Superservers
- ☐ 18 ☐ Remote Access/Communications Servers

- A** ☐ 101 **B** ☐ **REMOTE/WIRELESS COMPUTING**
- ☐ 19 ☐ Laptops
- ☐ 20 ☐ Notebooks
- ☐ 21 ☐ PDAs
- ☐ 22 ☐ PCMCIA
- ☐ 23 ☐ Mobile Data Services
- ☐ 24 ☐ Wireless Data Services
- ☐ 25 ☐ Wireless Data Equipment

- A** ☐ 102 **B** ☐ **INTERNETWORKING**
- ☐ 26 ☐ Bridges
- ☐ 27 ☐ Routers
- ☐ 28 ☐ Gateways
- ☐ 29 ☐ Bridge/Routers

- A** ☐ 103 **B** ☐ **COMPUTERS/PERIPHERALS**
- ☐ 30 ☐ Micros/PCs
- ☐ 31 ☐ Minis
- ☐ 32 ☐ Mainframes
- ☐ 33 ☐ Workstations
- ☐ 34 ☐ Front-End Processors
- ☐ 35 ☐ Terminals
- ☐ 36 ☐ Printers
- ☐ 37 ☐ Cluster Controllers
- ☐ 38 ☐ Fax Machines
- ☐ 39 ☐ Monitors

- A** ☐ 104 **B** ☐ **SOFTWARE/APPLICATIONS**
- ☐ 40 ☐ Network Management
- ☐ 41 ☐ Systems Management
- ☐ 42 ☐ Micro to Mainframe
- ☐ 43 ☐ Security
- ☐ 44 ☐ Communication/Terminal Emulation
- ☐ 45 ☐ Word Processing
- ☐ 46 ☐ Operating Systems
- ☐ 47 ☐ Client Server Applications Development

- A** ☐ **B** ☐ **SOFTWARE/APPLICATIONS (cont'd)**
- ☐ 48 ☐ Applications Development
- ☐ 49 ☐ Data Base Management/RDBMS
- ☐ 50 ☐ Spreadsheet
- ☐ 51 ☐ Groupware
- ☐ 52 ☐ EDI
- ☐ 53 ☐ E-Mail
- ☐ 54 ☐ Windows/Graphical User Interface
- ☐ 55 ☐ 4GL Development/Case
- ☐ 56 ☐ Multimedia
- ☐ 57 ☐ Graphics/DTP
- ☐ 58 ☐ Remote Access
- ☐ 59 ☐ Imaging
- ☐ 60 ☐ Suites
- ☐ 61 ☐ Middleware
- ☐ 62 ☐ Document Management

- A** ☐ 105 **B** ☐ **WIDE AREA NETWORKS EQUIPMENT & SERVICES**
- ☐ 63 ☐ Modems (9 6K bps and over)
- ☐ 64 ☐ Modems (under 9 6K bps)
- ☐ 65 ☐ T-1/T-3 Multiplexers
- ☐ 66 ☐ T-1/T-3 Services
- ☐ 67 ☐ Inverse Multiplexers
- ☐ 68 ☐ Fractional T-1
- ☐ 69 ☐ SMDS
- ☐ 70 ☐ ATM (Asynchronous Transfer Mode)
- ☐ 71 ☐ Matrix Switches
- ☐ 72 ☐ Packet Switches
- ☐ 73 ☐ Protocol Converters
- ☐ 74 ☐ Diagnostic/Test Equipment
- ☐ 75 ☐ DSU/CSU
- ☐ 76 ☐ Microwave
- ☐ 77 ☐ Fax Boards/Modems
- ☐ 78 ☐ VSAT
- ☐ 79 ☐ Fiber Optic
- ☐ 80 ☐ Satellite
- ☐ 81 ☐ ISDN
- ☐ 82 ☐ PBXs (over 1000 lines)
- ☐ 83 ☐ PBXs (under 1000 lines)
- ☐ 84 ☐ Automatic Call Distributors
- ☐ 85 ☐ Voice Messaging Systems
- ☐ 86 ☐ Videoconferencing/Teleconferencing
- ☐ 87 ☐ Voice Response/Processing
- ☐ 88 ☐ Dedicated Leased Line
- ☐ 89 ☐ Switched Data
- ☐ 90 ☐ E-Mail/Online Services
- ☐ 91 ☐ Image Processing
- ☐ 92 ☐ 800/900 Services
- ☐ 93 ☐ WATS/MTS
- ☐ 94 ☐ International
- ☐ 95 ☐ Virtual Networks
- ☐ 96 ☐ Frame Relay
- ☐ 97 ☐ Value Added Services
- ☐ 98 ☐ CIT (Computer-Integrated Telephony)
- ☐ 99 ☐ None of the above (1-98)

# NETWORK WORLD

## The Newsweekly of Enterprise Network Computing

☐ My home address is also my business address.

### Optional Delivery Address:

Enter your home address below if your company will not accept delivery at your business address:

\_\_\_\_\_  
Street Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

If military, please specify branch and base. \_\_\_\_\_

If government, please specify division: \_\_\_\_\_

## 6 What is the total number of LANS, Workstations/Nodes: At this Location/ In your Organization?

At This Location:			Entire Organization:		
LANs	Workstations/ Nodes		LANs	Workstations/ Nodes	
1 <input type="checkbox"/>	<input type="checkbox"/> 5000+		1 <input type="checkbox"/>	<input type="checkbox"/> 5000+	<input type="checkbox"/>
2 <input type="checkbox"/>	<input type="checkbox"/> 1,000 - 4,999	<input type="checkbox"/>	2 <input type="checkbox"/>	<input type="checkbox"/> 1,000 - 4,999	<input type="checkbox"/>
3 <input type="checkbox"/>	<input type="checkbox"/> 100 - 999	<input type="checkbox"/>	3 <input type="checkbox"/>	<input type="checkbox"/> 100 - 999	<input type="checkbox"/>
4 <input type="checkbox"/>	<input type="checkbox"/> 50 - 99	<input type="checkbox"/>	4 <input type="checkbox"/>	<input type="checkbox"/> 50 - 99	<input type="checkbox"/>
5 <input type="checkbox"/>	<input type="checkbox"/> 10 - 49	<input type="checkbox"/>	5 <input type="checkbox"/>	<input type="checkbox"/> 10 - 49	<input type="checkbox"/>
6 <input type="checkbox"/>	<input type="checkbox"/> 9 or less	<input type="checkbox"/>	6 <input type="checkbox"/>	<input type="checkbox"/> 9 or less	<input type="checkbox"/>
7 <input type="checkbox"/>	<input type="checkbox"/> None of the above	<input type="checkbox"/>	7 <input type="checkbox"/>	<input type="checkbox"/> None of the above	<input type="checkbox"/>

## 7 Check ALL that apply in columns A and B:

- A:** The following network platforms are currently installed.  
**B:** The following network platforms are currently planned.

- |  |   |
|--|---|
| <b>A</b> <input type="checkbox"/> 55 <b>B</b> <input type="checkbox"/> <b>NETWORK ARCHITECTURES</b>    | <b>A</b> <input type="checkbox"/> 57 <b>B</b> <input type="checkbox"/> <b>LAN ENVIRONMENT</b>           |
| <input type="checkbox"/> 01 <input type="checkbox"/> SNA   | <input type="checkbox"/> 30 <input type="checkbox"/> 4M TOKEN RING                                      |
| <input type="checkbox"/> 02 <input type="checkbox"/> DECNET  | <input type="checkbox"/> 31 <input type="checkbox"/> 16M TOKEN RING                                     |
| <input type="checkbox"/> 03 <input type="checkbox"/> MAP/TOP   | <input type="checkbox"/> 32 <input type="checkbox"/> ARCNET   |
| <input type="checkbox"/> 04 <input type="checkbox"/> TCP/IP  | <input type="checkbox"/> 33 <input type="checkbox"/> ETHERNET   |
| <input type="checkbox"/> 05 <input type="checkbox"/> DCA (Unisys)                                      | <input type="checkbox"/> 34 <input type="checkbox"/> 100 M ETHERNET                                     |
| <input type="checkbox"/> 06 <input type="checkbox"/> X.25  | <input type="checkbox"/> 35 <input type="checkbox"/> STARLAN  |
| <input type="checkbox"/> 07 <input type="checkbox"/> Novell IPX/SPX                                    | <input type="checkbox"/> 36 <input type="checkbox"/> FDDI   |
| <input type="checkbox"/> 08 <input type="checkbox"/> APPC/APPN/LU6.2                                   | <input type="checkbox"/> 37 <input type="checkbox"/> LOCAL TALK   |
| <input type="checkbox"/> 09 <input type="checkbox"/> NETBIOS   | <input type="checkbox"/> 38 <input type="checkbox"/> 10BASE-T   |
| <input type="checkbox"/> 10 <input type="checkbox"/> OSI   | <input type="checkbox"/> 39 <input type="checkbox"/> ATM  |
| <input type="checkbox"/> 11 <input type="checkbox"/> APPLE TALK  | <input type="checkbox"/> 40 <input type="checkbox"/> OTHER _____  |
| <input type="checkbox"/> 12 <input type="checkbox"/> NSF   |   |
| <input type="checkbox"/> 13 <input type="checkbox"/> XNS   | <b>A</b> <input type="checkbox"/> 58 <b>B</b> <input type="checkbox"/> <b>COMPUTER OPERATING SYSTEM</b> |
| <input type="checkbox"/> 14 <input type="checkbox"/> OTHER _____                                       | <input type="checkbox"/> 41 <input type="checkbox"/> DOS  |
|  | <input type="checkbox"/> 42 <input type="checkbox"/> UNIX/XENIX/AIX                                     |
| <b>A</b> <input type="checkbox"/> 56 <b>B</b> <input type="checkbox"/> <b>NETWORK OPERATING SYSTEM</b> | <input type="checkbox"/> 43 <input type="checkbox"/> OS/2   |
| <input type="checkbox"/> 15 <input type="checkbox"/> LOCAL TALK (APPLE TALK)                           | <input type="checkbox"/> 44 <input type="checkbox"/> OS/2 X   |
| <input type="checkbox"/> 16 <input type="checkbox"/> BANYAN (VINES)                                    | <input type="checkbox"/> 45 <input type="checkbox"/> IBM MVS  |
| <input type="checkbox"/> 17 <input type="checkbox"/> DCA (IRMALAN)                                     | <input type="checkbox"/> 46 <input type="checkbox"/> IBM VM   |
| <input type="checkbox"/> 18 <input type="checkbox"/> DCA (10-NET)                                      | <input type="checkbox"/> 47 <input type="checkbox"/> DIGITAL VMS  |
| <input type="checkbox"/> 19 <input type="checkbox"/> IBM (LAN SERVER)                                  | <input type="checkbox"/> 48 <input type="checkbox"/> MACINTOSH  |
| <input type="checkbox"/> 20 <input type="checkbox"/> IBM (PC LAN PROGRAM)                              | <input type="checkbox"/> 49 <input type="checkbox"/> WINDOWS  |
| <input type="checkbox"/> 21 <input type="checkbox"/> MICROSOFT (LAN MANAGER)                           | <input type="checkbox"/> 50 <input type="checkbox"/> WINDOWS NT   |
| <input type="checkbox"/> 22 <input type="checkbox"/> NOVELL (NETWARE, 2X, 3X, 4X)                      | <input type="checkbox"/> 51 <input type="checkbox"/> X WINDOWS  |
| <input type="checkbox"/> 23 <input type="checkbox"/> PROTEON (PRONET)                                  | <input type="checkbox"/> 52 <input type="checkbox"/> SOLARIS  |
| <input type="checkbox"/> 24 <input type="checkbox"/> 3COM (3+, 3+OPEN)                                 | <input type="checkbox"/> 53 <input type="checkbox"/> OTHER _____  |
| <input type="checkbox"/> 25 <input type="checkbox"/> ARTISOFT (LANTASTIC)                              |   |
| <input type="checkbox"/> 26 <input type="checkbox"/> HAYES (LANSTEP)                                   | <input type="checkbox"/> 54 <input type="checkbox"/> None of the above (1-53)                           |
| <input type="checkbox"/> 27 <input type="checkbox"/> DEC (PATHWORKS)                                   |   |
| <input type="checkbox"/> 28 <input type="checkbox"/> WINDOWS NT/ADVANCED SERVER                        |   |
| <input type="checkbox"/> 29 <input type="checkbox"/> OTHER _____                                       |   |

## 8 For which areas outside of the U.S. do you have purchase influence? (check all that apply)

- |                                   |  |  |
|-----------------------------------|--|--|
| 1 <input type="checkbox"/> Europe | 3 <input type="checkbox"/> South America | 5 <input type="checkbox"/> Middle East |
| 2 <input type="checkbox"/> Asia   | 4 <input type="checkbox"/> Australia     | 6 <input type="checkbox"/> None        |

## 9 Which of the following hardware platforms are installed/planned in your company? (check all that apply)

	Mainframes		Minis			Mainframes		Minis	
	Installed	Planned	Installed	Planned		Installed	Planned	Installed	Planned
01. IBM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	06. DATA GENERAL	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
02. DIGITAL	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	07. HP	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
03. AMDAHL	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	08. TANDEM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
04. AT&T	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	09. UNISYS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
05. BULL HNIS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10. OTHER _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## Which of the following do you have installed/planned: (USE NUMBERS ONLY)

	At This Location		Entire Organization	
	Servers	Clients/Nodes	Servers	Clients/Nodes
11. POWER MACINTOSH				
12. MACINTOSH OTHER				
13. POWER PC BASED				
14. PENTIUM BASED				
15. 80486 BASED				
16. 80386 BASED				
17. 80286 BASED				
18. 80806/80808 BASED				
19. ALPHA BASED				
20. RISC/UNIX BASED WORKSTATIONS				
21. OTHER				

## 10 What is the estimated value of networking equipment and services that you help specify, recommend or approve annually? (check one only)

- |  |   |   |
|--|---|---|
| 01 <input type="checkbox"/> \$100 million and over | 05 <input type="checkbox"/> \$10 - \$19.9 million | 09 <input type="checkbox"/> \$499,999 or less |
| 02 <input type="checkbox"/> \$50 - \$99.9 million  | 06 <input type="checkbox"/> \$5 - \$9.9 million   | 10 <input type="checkbox"/> None of the above |
| 03 <input type="checkbox"/> \$25 - \$49.9 million  | 07 <input type="checkbox"/> \$1 - \$4.9 million   |   |
| 04 <input type="checkbox"/> \$20 - \$24.9 million  | 08 <input type="checkbox"/> \$500,000 - \$999,999 |   |

## 11 Estimated gross annual revenues of your entire company/institution: (check one only)

- |  |   |  |
|--|---|--|
| 1 <input type="checkbox"/> Over \$10 billion       | 4 <input type="checkbox"/> \$100 to \$499.9 million | 7 <input type="checkbox"/> \$5 to \$9.9 million  |
| 2 <input type="checkbox"/> \$1 to \$9.9 billion    | 5 <input type="checkbox"/> \$50 to \$99.9 million   | 8 <input type="checkbox"/> \$4.9 million or less |
| 3 <input type="checkbox"/> \$500 to \$99.9 million | 6 <input type="checkbox"/> \$10 to \$49.9 million   | 9 <input type="checkbox"/> None of the above     |

## 12 Estimated number of employees: At This Location/In Entire Organization.

At This Location:			Entire Organization:		
1 <input type="checkbox"/>	<input type="checkbox"/> Over 10,000	4 <input type="checkbox"/>	<input type="checkbox"/> 1,000 - 2,499	1 <input type="checkbox"/>	<input type="checkbox"/> Over 10,000
2 <input type="checkbox"/>	<input type="checkbox"/> 5,000 - 9,999	5 <input type="checkbox"/>	<input type="checkbox"/> 500 - 999	2 <input type="checkbox"/>	<input type="checkbox"/> 5,000 - 9,999
3 <input type="checkbox"/>	<input type="checkbox"/> 2,500 - 4,999	6 <input type="checkbox"/>	<input type="checkbox"/> 499 or less	3 <input type="checkbox"/>	<input type="checkbox"/> 2,500 - 4,999
				4 <input type="checkbox"/>	<input type="checkbox"/> 1,000 - 2,499
				5 <input type="checkbox"/>	<input type="checkbox"/> 500 - 999
				6 <input type="checkbox"/>	<input type="checkbox"/> 499 or less



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# Heavy hitters to go for broke at PCS auction

*Five players to bid on all available licenses.*

BY DAVID ROHDE

Washington, D.C.

"This land is your land,  
This land is my land,  
From California to the New York  
island,..."

— Woody Guthrie

That was the song being sung last week by a number of players seeking broadband personal communications services (PCS) licenses throughout the country as they submitted applications to the Federal Communications Commission.

Five entities — AirLink, Inc., Associated VenCap Corp., J&M Partners, Pacific Telesis Mobile Services and Uninterruptible Business Power, Inc. — told the FCC they want to bid on all 99 available licenses (see graphic).

The applications entitle the players to bid for 30-MHz PCS licenses in 51 major regions

of the country starting Dec. 5. The licenses are available for each of the 51 so-called Major Trading Areas, minus three that already have been assigned under pioneer's preferences.

An additional five entities submitted applications for all 99 licenses but were kicked out by FCC staff because their applications were incomplete. These players have until tomorrow to submit more information or be disqualified.

But even the five with complete applications may not hold all the cards. Many groups that submitted applications for fewer licenses were simply filling in all the remaining gaps in their prospective nationwide networks.

For example, the four-way powerhouse of cellular affiliates from NYNEX Corp., Bell Atlantic Corp. and US WEST, Inc. along with AirTouch Communications, Inc., the

Notable PCS bidders	
A total of 99 licenses are up for auction.	
Bidder (Backer, if any)	No. of licenses applied for
Pacific Telesis Mobile Services	99
Continental Cablevision	95
American Portable Telecommunications, Inc. (Telephone & Data Systems, Inc.)	81
CCI Data (Cellular Communications, Inc.)	78
WirelessCo L.P. (Sprint, TCI, Comcast, Cox)	76
GTE Macro Communications (GTE Corp.)	63
PCS Primco L.P. (Bell Atlantic, NYNEX, US WEST, AirTouch)	52
EDS Spectrum Corp. (EDS Corp.)	52
AT&T Wireless PCS	59
ALAACR Communications (Craig McCaw)	42

cellular spin-off of Pacific Telesis, bid on 36% of the licenses.

And as expected, their licenses tended to be in areas centering around Dallas, Houston, Miami, Tampa, New Orleans, Tulsa and other areas outside their natural territories, according to a detailed analysis supplied to *Network World* by the Personal Communications Industry Association.

Also as expected, MCI Communications Corp. remained out of the running, while the new partnership of Sprint Corp. and three big cable companies put in for more than three-quarters of the available territories.

The FCC cautioned that some lesser known names could drop out before the bidding begins. That's because all applicants on Nov. 18 must submit huge up-front payments that scale up to the amount of territory they are seeking.

A similar procedure weeded out many before the FCC's earlier auction of narrow-band PCS licenses. ■

## Road map to broadband PCS auction

The top 10 licenses (by population) and corresponding entry fees.



To take part in the auction, companies must make up-front payments to the FCC of 60 cents for each person in a PCS license area. Dollar figures shown represent the entry fee to bid on that area.

GRAPHIC BY SUSAN SLATER

## IBM

Continued from page 10

company in the world, and it is trying to take software distribution to a higher level."

The Hughes system, known as DirecPC, uses a 24-inch satellite dish connected via coaxial cable to a 16-bit adapter card inside any personal computer outfitted with an IBM-supplied touch screen.

Using a menu of software products provided by IBM's Software Manufacturing Solutions division, users could browse through an electronic software library and touch the screen to order a product. The order would travel via satellite to IBM's software repository in Colorado, and the software would be downloaded to the DirecPC system in seconds.

The DirecPC system operates at up to 12M bit/sec and can fill up a 90M-byte PC hard drive in about 1 minute, said Thomas McPherson, vice president and general manager of DirecPC product development.

IBM and Hughes said DirecPC-based kiosks could also be deployed at retail software stores, giving them a "virtual inventory." Customers could download word processing, computer games and other software at the push of a button.

The DirecPC kit could be available as early as January for \$1,495. There will also be a basic subscriber service fee of about \$15.95 per month.

Users liked the idea of the satellite delivery system but expressed concerns such as how the software would be documented and where operational manuals would come from.

"I'm not unhappy with the way software is delivered today really," said Mark Allen, director of information systems for the Aspen Medical Group, PA in Minneapolis. "Getting [Program Temporary Fixes] from IBM hasn't been a problem, but if we were ever in an emergency situation and completely lost our network, this satellite system would be great."

Security is also a major issue — not only with the satellite system, but also with the Internet.

IBM and Hughes said the satellite transmissions would be encrypted with a special code that would scramble the transmission to all but the customer who ordered the software. As for Internet transmissions, IBM is working on security techniques to ensure secure software delivery.

©Hughes: (301) 428-5500.

## Agent

Continued from page 1

ing information on the operational status of network devices. Based on that information, agents are then directed by the SNMP console to get more data, set management variables or generate traps when significant events occur.

In systems management, agents are responsible for executing and enforcing policies established by a systems administrator and for notifying that administrator when policies are violated. Such policies might include initiating data backup, distributing software licenses or defining an enterprise file system.

To make agents as lightweight as possible yet allow users to gradually increase management functionality, some vendors are starting to pump out modular agent packages. LEGENT Corp., for example, recently announced AgentWorks, an SNMP-based product line that lets users choose among agents for systems, network, application and database management.

But modular agents have some potential drawbacks. It is possible, for example, that when a system is polled by a management console that more than one agent will respond. Agents may also vie for the same output port

when attempting to respond to a poll.

"If I have a [device] out there and LEGENT's got three or four agents on it, there's only one address," according to the SNMP architecture, said John McConnell, president of McConnell Consulting, Inc. in Boulder. "When I send an SNMP request to that address, how do I know which agent's going to get it, or how do I tell it how to do that?"

LEGENT resolves this by deeming one agent a master and the others as its subordinates. The master agent reconciles requests and responses, and multiplexes data from subordinates over any port on the managed device.

Other vendors are dealing with this issue in a similar fashion. SNMP Research, Inc. is currently tackling that problem with its Emanate extensible agent architecture, which supports master agents and subagents that work with various Management Information Bases.

### MASTERS AND SUBORDINATES

But just because different vendors support masters and subordinates does not mean their masters and subordinates will be compatible.

"If I have an [SNMP multiplexing] sub-agent and an Emanate master agent, those aren't going to play together," even though SNMP multiplexing is similar to Emanate's multiplexing method, said Jeff Case, president

of SNMP Research and one of SNMP's authors.

A number of vendors are backing Emanate, but the two largest SNMP platform providers — Hewlett-Packard Co. and SunSoft, Inc. — are not shipping agents based on it yet. IBM — another big platform vendor — supports SNMP multiplexing and other master/subagent application program interfaces but does not support Emanate, said Arthur Moore, IBM senior programmer for system design and structure.

Another potential pitfall for systems management product customers is trying to use agents from vendors other than their platform supplier. This is not so much a problem in net management because SNMP allows for such interoperability.

"If you're not getting your smart agents from one provider, the system object identifiers that [the agents] use are nonconsistent," said Frank Belland, senior communications

consultant at Martin Marietta Corp. in Orlando, Fla.

"The big question is whether we get some standardization of the agent interface so you can buy agents from somebody different than you buy management software from," said Jim

Herman, vice president of Northeast Consulting Resources, Inc. in Boston. "It seems weird that when you buy into a management software package, you'll have to buy into the agents that go with it."

The Desktop Management Task Force is trying to address this problem by defining an

"instrumentation" interface called the Desktop Management Interface (DMI), which is protocol-independent. The DMI is intended to make it easy to add management capabilities to computers, software and peripheral devices.

"[DMI] is the standard for agent creation," said Brian Biles, SunSoft business development manager. "There should be no mistake." ■

As users, we have to be very careful in the decisions we make related to [agents]."



MICHAEL DISABATO

**Rick Sturm**

US WEST Advanced Technologies



# Why to switch.

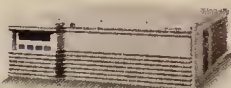
Switching is the most cost-effective way to add bandwidth to your network.



LinkSwitch hub

# How to switch.

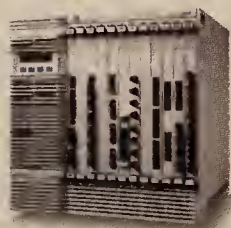
It's easy, just add a switching hub to your existing network.



LANplex 6004

# When to switch.

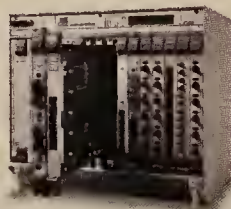
Now. Because you can immediately make better use of your network.



LANplex 6012

# Where to switch.

Many times it's where you're currently routing. You may need both.



LinkBuilder MSH with LinkSwitch module

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# ENTERPRISE INTERNETS

Data Network Architectures, Standards, Equipment and Management

## BRIEFS

**Federal Express Corp.** last week formed agreements with IBM, Apple Computer, Inc., Intuit, America Online, Inc. and CommerceNet to establish a desktop system for using FedEx services. As a result of the agreements, FedEx said it will roll out **FedEx Ship software** for Windows and Macintosh users that will let them complete shipping transactions, call for courier pickup and print shipping labels.

FedEx Ship will be made available at no cost, and all modem connections will be made via local or 800-number calls, FedEx said.

FedEx competitor, United Parcel Services of America, Inc., also announced a program last week that will let subscribers to the CompuServe and Prodigy on-line services request pickups and keep track of shipments.

**Primary Rate, Inc. (PRI)** late last month announced hardware and software enhancements that support **frame relay over ISDN** on its wide-area access products. The enhancements will work with ISDN-to-frame relay services being rolled out by several carriers starting early next year.

Pricing for PRI's new ISDN capabilities will vary widely depending on configuration.

PRI: (603) 898-1800.

**Cardinal Technologies, Inc.** started shipping a 19.2K bit/sec **V.32terbo modem** that avoids serial port throughput limitations with a controller chip optimized for Windows-based PCs.

Cardinal's 14.4/19.2Fax/Data Modem uses the AT&T Controllerless Modem Chip to bypass the traditional UART requirement of most PCs. The AT&T chip communicates directly with the Windows communications driver, using the PC's own microprocessor for data processing.

Available now, the modem costs \$99.

Cardinal: (717) 293-3124.

**PECO Energy Company** of Philadelphia last week said it will save more than **\$150 million** over the life of a 10-year contract it signed last week with IBM's outsourcing subsidiary, **Integrated Systems Solutions Corp. (ISSC)**.

PECO's information systems department will develop new applications, while ISSC will handle data center operations, help desk services, LAN and desktop administration, and applications maintenance. PECO executives said they outsourced their net functions to help them better concentrate on business, rather than networking issues.

**Bay Networks, Inc.** has rolled out enhancements to its **Site Manager router management software** that simplifies network configuration and improves monitoring and control of its Wellfleet line of routers.

Site Manager now includes a feature called configuration profiles that allows managers to easily copy, modify and deploy router configuration files on multiple routers.

The enhancements are now available in Site Manager 2.0.

Bay Networks: (508) 670-8888.

## Memorex steps up outsourcing push

BY MICHAEL COONEY

Reston, Va.

Memorex-Telex Corp. this week will open its first outsourcing service centers, key cogs in its effort to become a multivendor enterprise net service provider.

The service centers, known as Network Control Centers (NCC), will enable the company for the first time to offer multivendor net management and diagnostic capabilities. The centers are the heart of the firm's Advanced Services offering, which also includes network design, implementation and consulting services.

Memorex NCCs are located in Tulsa, Okla., Sydney, Australia, and an undisclosed site in Europe that ultimately will be tied together by T-1 lines and satellite services. Eventually, more than 300 other smaller NCCs will be located in cities all over the world.

Until now, most of Memorex's outsourcing services focused on the Systems Network Architecture world. With its Advanced Services package, it hopes to help SNA and other users build and manage multiprotocol enterprise nets.

"As users look to employ distributed client/server systems, they increasingly need help building, managing and monitoring those systems, and with the NCCs in place, we can now provide round-the-clock support," said David Scranton, director of technology for Memorex.

Aspen Medical Groups, PA hired Memorex to handle its recently installed LAN internetwork because it did not have the personnel or resources to manage the

network in-house.

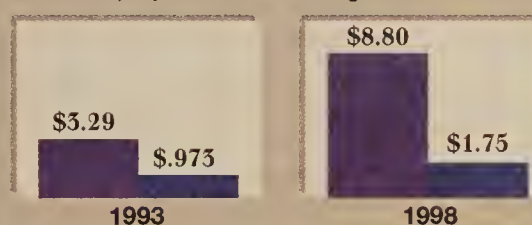
"We needed help in keeping the LANs up and running 24 hours a day, seven days a week; and Memorex, with its NCC in Tulsa, let us do that without having to hire additional personnel," said Mark Allen, NCC beta user director of IS for Aspen, a health care provider in Minneapolis.

Advanced Services, which was announced earlier this year (NW, July 18, page 13) includes four components: Strategic Services, Integration Services, Perfor-

### Rolling in service dough

(In millions)

Growth projections for management services.



■ = Distributed systems management  
■ = Remote services, including net monitoring and systems diagnostics

GRAPHIC BY TERRI MITCHELL

mance Control and Education Services. Users can contract with Memorex for all or part of the Advanced Services suite.

Strategic Services is the firm's consulting arm, which helps users plan, design and build an enterprise net. With Integration Services, Memorex helps users integrate multivendor devices by providing the connectivity software and hardware that will link different platforms. Education Services

provide end-user training on new systems.

The NCCs will implement the Performance Control aspect of the Advanced Services package. With it, users can outsource all or parts of their local and remote net management requirements.

Scranton said NCC staff will remotely monitor, diagnose and correct at least 65% of all net problems. For the other 35%, NCC staff orders and coordinates service calls.

"Remote network services offer a solution to many companies whose network development and management needs have grown beyond their internal resources and capabilities," said Mike Melenovsky, an analyst with International Data Corp. in Framingham, Mass. "Memorex's NCCs provide platform-independent remote services, a range of options and an experienced NCC staff."

A key Memorex strength, analysts said, is its 20 years of SNA experience and close relationship to other vendors in the industry, including Intel Corp., Data General Corp. and Fujitsu, Ltd. Its most important relationship, however, is its partnership with Novell, Inc.

In 1991, Memorex and Novell signed an agreement that integrated Novell's LAN products with Memorex's SNA technologies. In fact, Memorex now has more than 300 Novell Certified NetWare Engineers (CNE) or Enterprise CNEs on staff.

Market researchers at Dataquest Worldwide Services Group in Framingham said 38% of the Memorex's \$1 billion revenue last year came from services.

©Memorex: (214) 444-3500.

## REMOTE LAN ACCESS

### Ascend offers up single-user bridge/router

BY MICHAEL CSENGER

Alameda, Calif.

Ascend Communications, Inc. today will announce a single-user bridge and IP router designed for maximum performance when using ISDN as a remote LAN access link.

The Pipeline 50 HX derives from Ascend's Pipeline 50 product line, a dial-up router supporting multi-user remote offices. The Pipeline 50 costs about \$1,500, too much for individual users, according to the company.

At a base price of \$995, the Pipeline 50 HX connects to a personal computer's Ethernet adapter and, with an optional internal Network Terminator 1 (NT1), directly to an ISDN Basic Rate Interface line.

The Pipeline 50 HX is a full-function dial-up bridge and IP router, unlike typical ISDN terminal adapters, which rely on separate software support for

See Ascend, page 16

## Retix unveils low-cost ATM module for its line of routers

BY JIM DUFFY

Santa Monica, Calif.

Retix has announced an Asynchronous Transfer Mode (ATM) interface module and a new version of the operating system for its RouterXchange 7000 router that together allow users to connect their LAN internetworks with ATM nets.

The ATM Interface Module (AIM) sports a single 100M bit/sec Transparent Asynchronous Transmitter/Receiver Interface, but Retix plans to add 155M and 45M bit/sec ATM interfaces to AIM next year. AIM supports ATM adaptation Layers 3 and 4, which define segmentation and reassembly of LAN packets into ATM cells, and connection-oriented data transmission.

The module supports the ATM Forum User-to-Network Interface 3.0 definitions for permanent virtual circuit (PVC) interoperability with ATM

switches. It has been tested for interoperability with switches from Fore Systems, Inc., Network Equipment Technologies, Inc. (NET), Newbridge Networks, Inc. and Bay Networks, Inc.

See Retix, page 16

### Features of Retix's ATM interface module

- ◆ Segmentation and reassembly of LAN packets into ATM cells.
- ◆ 100M bit/sec TAXI interface, with OC-3 and T-3 planned.
- ◆ UNI 3.0 support for PVCs.
- ◆ Support for ATM adaptation Layers 3 and 4.
- ◆ Support for as many as 256 PVCs and 2,048 SVCs on NET's ATM switch.
- ◆ LAN emulation for NET ATM.
- ◆ Costs \$8,000 and will be available in December.



# Micom boosts voice compression, adds fax feature to muxes

BY MICHAEL CSENGER

Simi Valley, Calif.

Micom Communications Corp. now offers a voice/fax upgrade multiplexer module that improves the quality of voice compression and lets a single fax machine access both public phone lines and private nets based on Micom Marathon or NetRunner muxes.

The Universal Voice Module (UVM) is based on a digital signal processor that operates at 20 MIPS, twice the speed of Micom's earlier processor. It delivers better sounding voice quality at compression rates as low as 4.8K bit/sec, the company said.

Fax Relay is a software option for the UVM that lets any fax machine use both public and private network services. Previously, Micom's Marathon and NetRunner customers had to operate separate fax machines — one for interoffice faxes on the Micom network and another to receive and send faxes over public phone lines.

Or, users had to install a line-sharing device that switched fax calls to the appropriate network. Micom's Fax Relay option now handles this function itself, automatically.

Micom's Marathon and NetRunner product lines integrate data, voice, fax and LAN traffic over 9.6K to 128K bit/sec leased lines.

## Micom's UVM voice/fax upgrade

Digital signal processor is twice as fast as previous version.

Faster processor speed improves voice quality.

Supports as many as 2 voice/fax interface modules.

Works with Marathon and NetRunner multiplexers.

Fax Relay option sends fax on public and private nets.

signal processing chip handles all voice compression, silence suppression and fax support functions.

Voice quality is an important selling point for Micom, especially at high compression rates, said Maribel Howard, a research analyst at International Data Corp., a market research company in Framingham, Mass.

"I've never had any Micom customers complain about the voice quality of their networks," Howard said. "But Micom is always striving to be a little bit better — they need to offer every technology milestone they can."

Micom has always had to beat its drum loudly to get the attention of its small and midsize customer base, Howard said. "Something like the Fax Relay option really helps to ease the user's mind, making the network a bit simpler to implement."

The UVM and Fax Relay option is available now. Two different UVM boards can support either one or two voice/fax modules, and cost \$1,200 and \$1,800, respectively. The Fax Relay option costs another \$200.

©Micom: (805) 583-8600.

# NHC intros physical, logical mgmt. pack

BY JIM DUFFY

Montreal

NHC Communications last week unveiled Wireman, a Windows- and SNMP-based net management package that combines management of logical network groupings with control over the physical infrastructure.

Wireman is designed to bring the capabilities of higher end physical management systems, such as Accugraph Corp.'s MT923 and ISICAD, Inc.'s Command, to LAN managers at divisional branches and remote sites. The objective is to make it easier for administrators at these sites to reduce downtime by tracking moves, adds and changes while managing the performance of their routers and hubs, tasks usually reserved for corporate MIS departments.

"I think it's going to make it a lot easier for network administrators to manage remote sites where there's no full-time professional on board," said Bob Saka-keeney, senior consultant at Aberdeen Group, Inc. in Boston.

Features of Wireman include automating moves, adds and changes, tracking network assets, providing physical and logical network views, simplifying Simple Network Management Protocol device management and automating responses to network failures.

For moves, adds and changes, Wireman lets network administrators drag and drop icons representing network elements onto

the appropriate LAN segments. Wireman then sends an SNMP message to a router or a hub to change an element network address and subnet identification once that move has been made, or prints a work order for a net-

tion to discover, map and display the network in both its physical and logical configurations.

These configurations can be viewed from the enterprise level to the floor plan of one department. Physical views are useful for drilling down to a specific network connection, while logical views show LAN segments and WAN links to help conceptualize network changes.

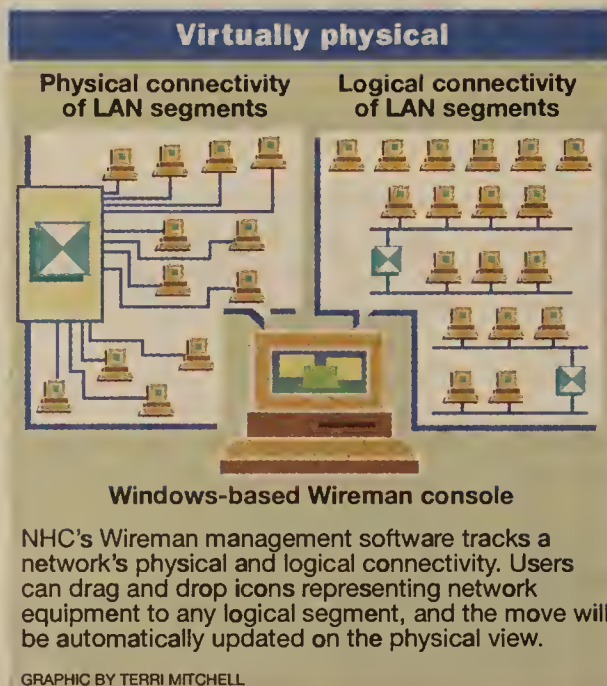
And because data on physical and logical connectivity is stored in the same database, a change to one view is automatically updated on the other.

SNMP device management, meanwhile, is simplified through Wireman because Management Information Base variables are depicted as objects represented by color-coded icons that show the status of device events, thresholds, alarms and traps that are defined by the user.

Lastly, Wireman has a fault management subsystem that automatically implements remedial action using pre-defined rules stored in the Wireman database. Wireman also has an event and alarm management subsystem that determines whether faults can be handled automatically or whether they require sending an alert to the network administrator.

Wireman is available now at prices ranging from \$495 to \$2,495, depending on the number of managed objects and SNMP devices.

©NHC: (800) 361-1965.



GRAPHIC BY TERRI MITCHELL

work technician to manually update directories and routing tables.

For asset tracking, Wireman's database stores information about network users and equipment, terminals, workstations and personal computers, cables, cross-connect devices, wall plates, hubs, servers, routers, front-end processors, hosts and any other network device. Wireman uses this informa-

## Ascend

Continued from page 15

LAN interworking. Its native IP support provides features and throughput efficiencies that terminal adapters cannot match, the company said. For example, the Pipeline 50 HX's routing supports wide-area traffic filtering to reduce unnecessary overhead, plus all the security features of an IP network.

It also allows direct Simple Network Management Protocol handling, something not possible with simple bridge or terminal adapter solutions, said Steve Thomas, Ascend's director of product marketing.

"SNMP is a routed protocol, so without a router, those remote clients can't be SNMP-managed from a central location," Thomas said. Other standard Pipeline features include inverse multiplexing of two ISDN B channels for 128K bit/sec throughput and data compression for effective throughput of up to 512K bit/sec.

### ETHERNET WAN

By connecting to the PC's Ethernet port, the Pipeline 50 HX avoids the throughput limitations of PC serial ports, said Robert Ryan, Ascend's founder and chief executive officer.

"Ethernet is the only way to get fast throughput into a PC," Ryan said. "Coupled with ISDN, it's the only real solution for high-speed remote access."

Ascend considered using the PC's

parallel port, as Microcom, Inc. does with its 28.8K bit/sec modems and LANexpress server, but found Ethernet more effective to work with, Ryan said.

"This [product] is an absolute natural for the Internet," said Frank Dzubek, president of Communications Network Architects, Inc., a Washington, D.C.-based consultancy.

Ascend's bridge/routing approach includes flow control and other features that make it far more efficient

than most other remote access solutions, Dzubek said, especially when coupled with the firm's central-site product, the Pipeline Max.

"In the old days of PCs and modems, you wouldn't care

RYAN

these kinds of efficiencies because the PCs themselves were limited," Dzubek said. "But now you get into [Peripheral Component Interconnect] bus-based machines transferring images and using Mosaic, and you can really start taking advantage of the throughput ISDN can offer."

Available now, pricing for the Pipeline 50 HX starts at \$995, or \$1,195 with an internal NT1. For a \$600 software upgrade, the HX can later be converted to a standard, multiuser Pipeline 50.

©Ascend: (510) 769-6001.

## Retix

Continued from page 15

AIM supports as many as 256 PVCs and is compliant with NET's signaling and LAN-emulation technology for the NET ATM switch. The module supports up to 2,048 switched virtual circuits with the ATM switch, Retix said.

AIM costs \$8,000 and will be available within 60 days. AIM's advantage over competitive offerings from Bay and Cisco Systems, Inc. is its price, which is less than half of the \$20,000 price tags for those interfaces. But the Bay and Cisco modules support 155M bit/sec now.

"Eight thousand dollars is pretty damn cheap for an ATM interface," said John DePietro, WAN analyst at International Data Corp. in Framingham, Mass. "The question is, where are they going to stick this thing? In terms of being in leading-edge backbone environments where ATM is going to be deployed, I don't think Retix has a tremendous presence. But certainly this will help them get inroads to that, especially at that price."

Meanwhile, Version 3.0 of the RouterXchange 7000 operating system has been enhanced to work with the AIM module. The operating system allows RouterXchange 7000s to route IP and IPX traffic between ATM and Ethernet, token-ring, Fiber Distributed Data Interface, frame relay, X.25 Point-to-Point Protocol and leased-line interfaces, and bridge all other protocols.

This capability, together with the AIM module, allows the RouterXchange 7000 to be deployed as an edge router for nets with ATM switching at their core, as well as a foundation for a collapsed backbone net.

Version 3.0 of the RouterXchange 7000 operating system costs \$1,500 and will also be available within 60 days.

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The world of global networking, often referred to as Cyberspace, is under construction. The Internet, one of the primary building blocks on the road to cyberspace communication, offers companies of all sizes, in all markets, the opportunity to stake a claim in the globally networked future.

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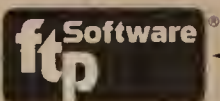
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The new AS/400 Advanced Series from





by Dan Minoli

## Making the case against 25M bit/sec ATM

All of a sudden, enterprise network designers are faced with a plethora of high-speed networking options: Asynchronous Transfer Mode, switched Ethernet, two versions of 100M bit/sec Ethernet, full-duplex Ethernet, FDDI, FDDI II and the Fiber Channel Standard to name a few.

Given that, who needs another version of ATM, specifically 25M bit/sec ATM? The answer should be: nobody.

Historically, what has frustrated the widespread application of technologies such as packet switching and ISDN in the enterprise has been problems associated with interoperability.

ATM, on the other hand, was supposed to increase the synergy between private and public networks.

The choice of 52M, 155M and 622M bit/sec for ATM was based on the desire to use rates consistent with the Synchronous Optical Net-

work (SONET) rates employed in the public network. If we do not employ SONET-based rates on both sides of the enterprise network, then there must be speed conversion.

I consider speed conversion to be one of the least desirable types of conversions. High-speed processors can easily strip frame headers and trailers for Protocol Architecture A and replace them with those for Architecture B, but speed conversion can only be accommodated by a compromise to the least common denominator or by allocating large amounts of buffering. Neither choice is desirable.

To support an enterprise network, an entire suite of equipment is needed: PC network interface cards (NIC), hubs, switches, routers, server interfaces, WAN interface equipment, ATM-ready multiplexers and data service units, for example.

Thus, the use of 25M bit/sec ATM to the desktop may require the development of an entire line of new equipment.

This not only raises the interworking issue between 25M bit/sec ATM and other ATM equipment, but also within the set of 25M bit/sec ATM equipment itself. All of this has the net effect of reducing overall simplicity and interoperability, putting us at risk of repeating the ISDN debacle.

In addition, it may suggest to some carriers the idea of having to support a 25M bit/sec WAN service, thereby further complicating the tariff and important economic analyses, which user organizations will invariably have to undertake.

The formation of the Desktop ATM25 Alliance is no great consolation. The effort required to work out all the standards is massive, as documented by the work of the ATM Forum. So why channel more resources into developing new specifications?

Currently, 25M bit/sec ATM does have one advantage: It has a per-connection cost of \$1,200 (\$400 for the NIC and \$800 for the hub port), while higher speed ATM has a connection cost of \$2,000 (\$800 for the NIC and \$1,200 for the hub).

But note that standard ATM delivers twice the speed, so that under a dollar-per-megabit-per-second metric, it is actually cheaper than the 25M bit/sec technology. In addition, the expectations are that standard ATM costs will come down in the next two to three years.

And standard ATM is scalable: Network managers can add bandwidth as needed, particularly as desktop video, videoconferencing, distance learning, imaging and multimedia applications are added to the enterprise network.

So why settle with a Band-Aid solution when one can get the real thing with its intrinsic scalability, interoperability and vendor support from more than 600 companies?

Let's move forward with ATM in the enterprise now, but let's move forward at the accepted standard rates.



Minoli is a principal consultant at DVI Communications, Inc., a full-service consultancy in New York. He can be reached at minoli@pipeline.com. Minoli's column alternates in this space with that of Harvard University's Scott Bradner.

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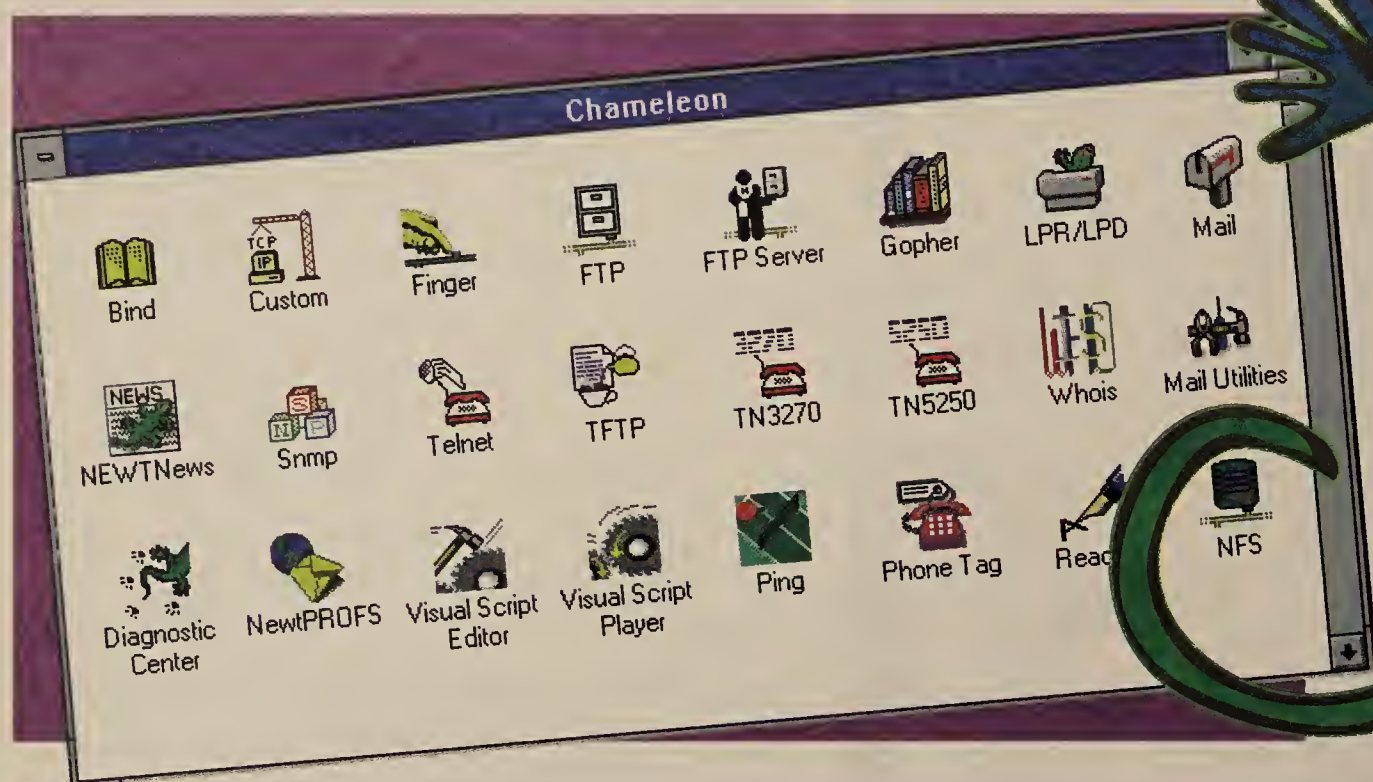
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# LOCAL NETWORKS

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## Digital expands its AlphaServer line

BY MARGARET DORNBUSCH  
Maynard, Mass.

Digital Equipment Corp. last week bolstered its lineup of 64-bit Alpha processor-based servers with five new versions that offer customers a wider choice of operating systems and configurations.

The new AlphaServers, based on Digital's Alpha AXP 21064A Reduced Instruction Set Computing processor, give customers the choice of running Digital's DEC OSF/1 and OpenVMS operating systems, as well as Microsoft Corp.'s Windows NT Advanced Server. Digital's earlier Alpha-based server ran Digital operating systems exclusively.

Digital has sold more than

\$1 billion worth of Alpha servers and workstations since their introduction two years ago, but greater operating system support will be crucial for Digital to increase its server sales.

A Dataquest, Inc. survey of 200 information systems managers who have moved or are in the process of moving to client/server computing found that operating system choice is the second most important criterion for selecting a server, according to Brad Day, director of client/server computing worldwide for Dataquest, a market research firm in Framingham, Mass.

Digital's new servers, which feature Peripheral

Component Interconnect (PCI) buses and other industry-standard components, are well suited for users that are upsizing and downsizing applications, according to Day. He expects that the servers will be used to support heavy-duty applications such as databases and multimedia programs.

### THE LINEUP

The highest end model being rolled out is the 7000-700 system, an enterprise server that offers one to six 275-MHz processors, 14G bytes of memory and 58G bytes of internal storage. At this time, the 7000-700 is not designated as an AlphaServer because it neither uses a PCI bus nor offers Windows NT support.

But Digital plans to move the server into its AlphaServer line by offering an upgrade to its Alpha AXP 21164 chip, a new processor that tests show is even faster than the AXP 21064A chip. At that time, probably in  
*See Digital, page 25*

## Novell, AT&T try again to push computer-integrated telephony

BY KEVIN FOGARTY AND DAVID ROHDE

Washington, D.C.

Novell, Inc. and AT&T last week announced enhancements to their computer-integrated telephony technology — NetWare Telephony Services (NTS) — that will include support for UnixWare and call center management.

Although company officials positioned Version 2 as providing more functionality for users, the new release also was needed to mollify concerns of independent software vendors (ISV) and private branch exchange manufacturers that have been slow to deliver support for NTS.

Siemens Rolm Communications, Inc., for example, said the upgraded technology in Version 2 is what is needed for the vendor to deliver a driver between its PBXs and NetWare LANs during the first quarter of 1995. Rolm passed on Version 1 because it was not fully compliant with the Computer Supported Telecommunications Application (CSTA) standard on which Telephony Services Application Programming Interface (TSAPI) is based.

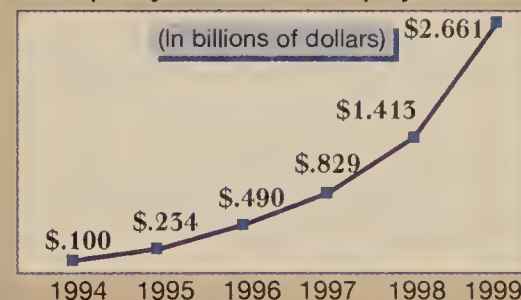
"Rolm needed some things within CSTA

that were not in the first release," conceded Dan Massiello, AT&T's general manager of computer-telephone integration applications.

Despite last week's announcement, only a small minority of users — those with high-line AT&T Definity G3 PBXs or switches from Mitel Corp. or Comdial Corp. — can use either version of NTS.

### Call it a growth market

U.S. PC-based computer-integrated telephony market revenue projections



The fastest growth in the CTI market will come from sales of automatic call distributors and applications aimed at knowledge workers.

GRAPHIC BY TERRI MITCHELL SOURCE: DATAQUEST, INC., SAN JOSE, CALIF.

Twenty other PBX manufacturers have announced support, but some have put the  
*See Telephony, page 25*

## BRIEFS

**CNet Technology, Inc.**, funded by Taiwan's Ministry of Economics, last week said it will begin development on a family of high-speed **Asynchronous Transfer Mode** wide- and local-area networking products. The ministry's Industrial Development Bureau will invest \$1.5 million and CNet will invest \$1 million to develop products such as Ethernet-to-ATM hubs. The first products are scheduled to ship in the first quarter of 1995, with a broader line in place by the end of 1995.

CNet: (800) 486-2638.

**BusLogic, Inc.** last week announced Chantal RAID Software for NetWare 5.0, a new version of its **RAID software** that drops the price of fault tolerance to under \$1 a megabyte by allowing users and systems integrators to build RAID systems using off-the-shelf components. The software, which supports NetWare 4.02, costs \$695 and will be available in December.

BusLogic: (408) 492-9090.

**Scope Communications, Inc.** last week announced a new version of its **cable analyzer** that can test for compliance with high-speed Ethernet specifications. WireScope 100 3.0 can test for propagation delay limits required by 100M bit/sec cable requirements. Version 3.0 tests for 20 LAN specifications, adding six high-speed protocols: 100VG-AnyLAN, 100Base-T4, 25M bit/sec Asynchronous Transfer Mode, 100Base-TX, 51M bit/sec ATM and ISDN. WireScope 100 3.0, which is available now, costs \$3,495 with a passive injector or \$3,795 with an active injector.

Scope: (508) 393-1236.

**Bay Networks, Inc.**, the company formed by the SynOptics Communications, Inc.-Wellfleet Communications, Inc. merger, last week reduced prices of its SynOptics System 800 **workgroup hub** by 25%. Originally \$399, the eight-port, 10Base-T hub now costs \$299 — a per-port price of \$37.

Bay Networks: (408) 988-2400.

## Microsoft revs up SNA Server engine

BY PEGGY WATT

Redmond, Wash.

When its operating system partnership with IBM was dissolved four years ago, Microsoft Corp. was ready to dump its LAN-to-host Communications Manager, along with OS/2, but Product Manager Vesa Suomalainen wouldn't let it go.

"He really pushed internally to keep the product alive," said a coworker.

Suomalainen, as general manager of Microsoft's SNA Server product unit, now presides over the rebirth of a more robust, mature Systems Network Architecture gateway, now known as SNA Server. It still gives network users access to IBM SNA mainframes and Application System/400 systems but now has a flock of third-party support and takes advantage of a new operating system, Microsoft Windows NT 3.5.

"SNA Server is really in its seventh release," although it is numbered Version 2.1, Suomalainen said. It first shipped under the name SNA Server a year ago, but the release Microsoft began shipping last month is part of an aggressive campaign to lure users from Novell, Inc.'s NetWare for SAA.

In fact, Novell is recoiling from a pointed comparison Microsoft issued pitting SNA Server 2.1 against NetWare for SAA 1.3b. Mike Ober, Novell product-line manager for host connectivity, called

the comparison "littered with implausible, unbelievable statements," and said that, at best, it cites feature omissions that Novell will correct in an update to

### Microsoft says:

"SNA Server supports 2,000 clients and 10,000 logical unit sessions per server; NetWare for SAA supports 254 clients and 254 logical unit sessions.

SNA Server has robust development APIs, while NetWare for SAA APIs are weak.

SNA Server runs on Alpha- and MIPS-based workstations, while NetWare for SAA runs on Intel-based PCs only.

Novell recommends a dedicated server for NetWare for SAA.

ship early next year.

For example, NetWare for SAA 2.0, which will ship about the same time as NetWare 4.2, will provide automatic load balancing and hot backup functions listed by Microsoft as current deficiencies, Ober said. "It will be an advantage of their product for all of about three months," he said.

But Microsoft's aggressive pursuit will only heighten competition and improve users' options, analysts said.

### Novell says:

"How can you test a product for 10,000 sessions? NetWare for SAA 2.0 will support 2,000 sessions.

More applications are written to NetWare for SAA than for any SAA product in the market.

There is no customer interest in NetWare for SAA on RISC systems.

Novell neither recommends nor discourages a dedicated server for NetWare for SAA. Novell tests show that the product uses less than 15% of the CPU cycles when running 500 or fewer concurrent sessions to a host.

Architects, Inc., a consultancy in Washington, D.C.

"This is the first salvo, though. Novell has to come up with an equal or better salvo now," he added.

But Microsoft must persuade customers to switch operating systems to run  
*See Microsoft, page 25*



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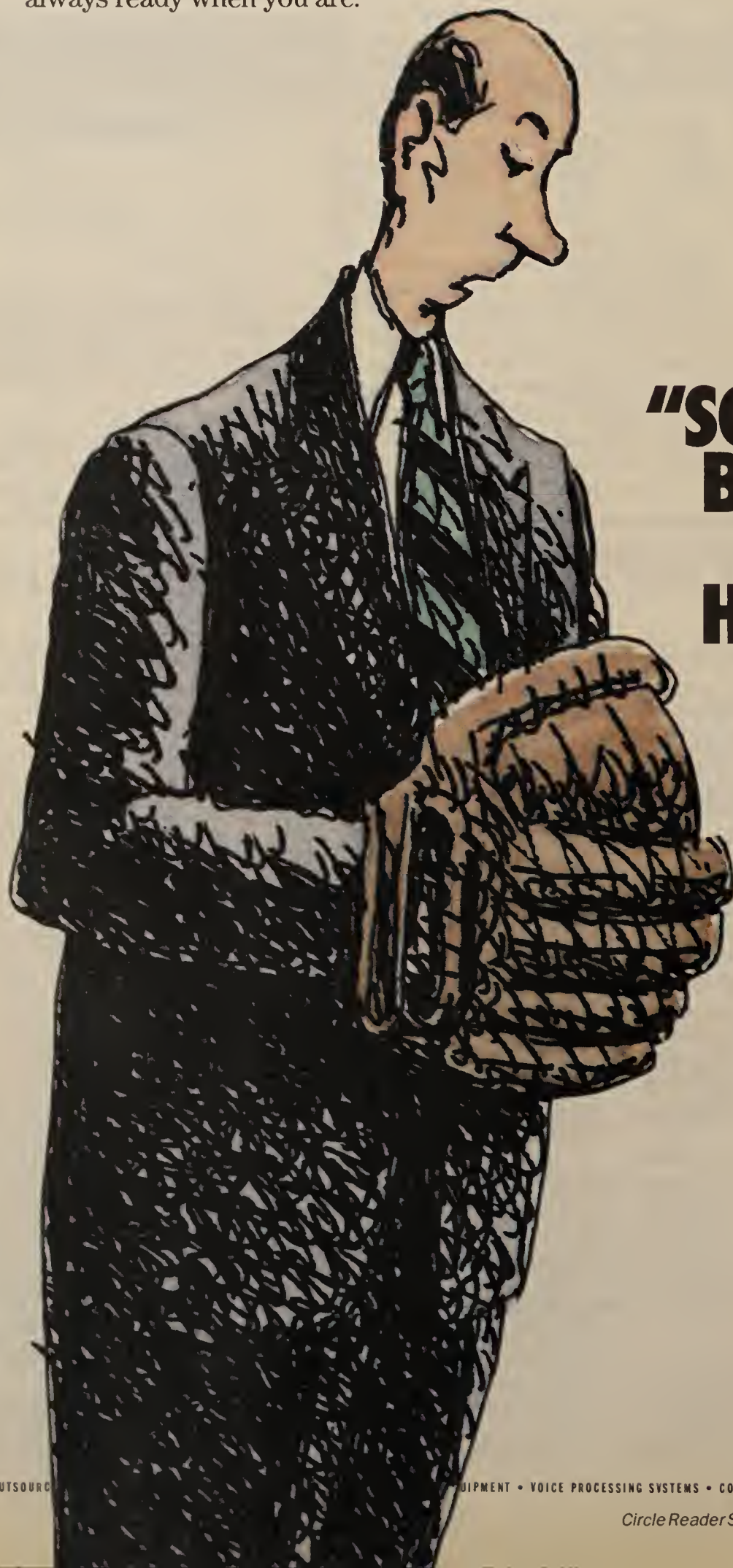
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# DCA, SimWare spiff up LAN access software

BY MICHAEL CSENGER

Digital Communications Associates, Inc. and SimWare, Inc. last week each released new versions of their software-based LAN access products that offer enhanced protocol support, management features and port capacity.

DCA announced Version 3.0 of its Remote LAN Node (RLN) software, while SimWare, Inc. announced A2B Version 3.0. Both run on dedicated PCs and let remote users access corporate LANs over phone lines as if they were locally attached. Once connected, the user navigates among LAN servers as normal while running applications loaded on the remote PC.

DCA's RLN 3.0 adds support for X.25 WAN links, plus dynamic TCP/IP addressing for each call, which simplifies address management.

This adds to DCA's existing support for LAN protocols such as TCP/IP and Novell, Inc.'s IPX, along with the Point-to-Point Protocol for the wide area.

DCA also doubled the maximum number of server ports to 32 and added OS/2 client support, along with DOS and Windows.

SimWare's A2B is fundamentally the same type of product as RLN. But SimWare adds protocol support for host-based systems, letting users access mainframe applications without hav-

ing to run separate software during the remote access session.

SimWare's A2B supports Macintosh, DOS and Windows clients. The firm added TCP/IP support last month and IPX for NetWare LANs last week.

SimWare also added support for Visual Basic, an application development tool that helps optimize applications for remote access usage.

## SOFT VS. HARD SOLUTIONS

The key to both products is that they are software-based.

"The software guys say their's is a more flexible approach, easier to upgrade than a dedicated hardware platform," said Kitty Weldon, an analyst at The Yankee Group, a Boston-based consultancy. "Certain WAN optimization features [like those announced last week] can be more easily implemented this way. But the hardware vendors are starting to do the same with swappable cards, as well."

DCA's RLN 3.0 is available now and costs \$895 to \$14,395 for server software with two to 32 ports; client software is free. SimWare's A2B 3.0 will be out in December and will cost from \$650 to \$4,850 for one to 16 ports; client software will cost \$395 for the first one and \$59 for each additional one.

©DCA: (800) 348-3221; SimWare: (613) 727-1779.

## Digital

Continued from page 23

the next six to nine months, the 7000-700 will be able to run Windows NT.

The AlphaServer 2100 4/275 and the AlphaServer 2100 CAB are departmental servers that offer one to four 275-MHz processors, up to 2G bytes of memory and 32G bytes of internal storage. The cabinet enclosure provides up to eight processors and support for hundreds of networked users.

The AlphaServer 2000 4/200, a symmetrical multiprocessor-based work-

group server, offers a choice of one or two processors, as many as 640M bytes of memory, 16G bytes of internal storage, three PCI slots and seven Extended Industry Standard Architecture (EISA) I/O slots.

The AlphaServer 1000 4/200, Digital's entry-level server, is designed for small businesses. It offers a single processor, as many as 512M bytes of memory, 14G bytes of internal storage, two PCI slots, seven EISA slots and one combination PCI/EISA I/O slot.

The new servers are available now and will cost from \$16,000 to \$120,000.

©Digital: (800) 344-4825.

## Microsoft

Continued from page 23

SNA Server, said Lynn Nye, chief executive officer of NetResults, Inc., a Portland, Ore., consulting firm. "It's so tightly integrated that the decision is not separated from the [operating system]," Nye said.

For example, SNA Server's support for load sharing is enabled by Windows NT and is a blow at NetWare for SAA, said John Morency, an analyst with Strategic Networks Consulting, Inc. in Rockland, Mass. "[Load sharing] is a logical collection of SNA Server boxes for which you have a single logon," he said. "It makes for a very high-power, high-availability gateway."

Suomalainen credits the operating system with many of SNA Server's strengths, including its graphical interface, memory management and integrated administration tools. "SNA Server is very wedded to Windows NT. You won't see it on any other operating system," he said.

Microsoft is already planning its next update to SNA Server. Its staff recently previewed the product running on a prototype PowerPC (also running Windows NT). "We're committed to ship SNA Server for the PowerPC within two weeks of the machine shipping," Suomalainen said. Potential enhancements include support for the High Performance Routing feature of IBM's Advanced Peer-to-Peer Networking. ■

## Windows Connectivity Forum

# New modem specs and the missing fax

Desktop application and videoconferencing may be the wave of the future, but user choices in this area will be limited unless modems can support the simultaneous transfer of voice, data and video over phone lines.

To ensure that such technology becomes widely available, Intel Corp. is spearheading an effort to establish a modem standard that will support such applications. Without such a standard, users could be forced to use proprietary modems bundled with services from the carriers.

Intel is being joined by AT&T, Hayes Microcomputer Products, Inc. and Rockwell International Corp. in its efforts.

The specification could be revealed as soon as the Comdex show next week, with AT&T and Intel reportedly set to demonstrate a new AT&T modem supporting the spec and running in conjunction with Intel's Windows-based ProShare conferencing offering.

## NOT IN MS BACKOFFICE

Developers looking to build facsimile products that work with Windows NT have learned that there is no fax server component in Microsoft Corp.'s BackOffice Windows NT server-based software bundle.

But it has been apparent from scanning the Windows Connectivity (WINCON) Forum that both integrators and corporate users are looking at Windows NT as a fax server platform.

They cite several reasons for this desire:

- The 32-bit Windows NT operating system is well suited to process faxes.
- Windows NT's multitasking technology can handle interrupt-based fax communications well.
- Windows NT is seen as a messaging platform — a platform that may need to support fax technology.

One vendor, Optus Software, Inc., released a product called FACSys Fax Messaging Gateway 4.0 for Windows NT shortly after Windows NT 3.5 was launched in September. From what we have heard, the product works well with corporate electronic mail systems and other network applications. The company even promises to make the product work with Exchange, Microsoft's next-generation messaging product.

## BRAINTEASER

Here's a tough question from the WINCON Forum last week that could use a response.

By Joel Diamond  
Technical director

WUGNET

Windows User Group Network

76702.1023@CompuServe.com

Bruce Clark wrote that he is the owner of a stock brokerage firm that wants to install a LAN and eventually a WAN to support a quote service from Quotron Systems, Inc. The quotes will come into a Unix server via a dedicated phone line, and the goal is to break out the data to workstations on an Ethernet LAN via TCP/IP.

The problem is that Clark believes he may need to run Novell, Inc. NetWare to support the TCP/IP communications because he doesn't feel that either Windows for Workgroups or Windows NT 3.5 have decent TCP/IP

server support. Any suggestions?

## PICK OF THE WEEK

This issue's pick of the week is John Junod's WinSock 1.1-compliant WS-FTP 2.04 client software, which can be found in the Internet/WinSock Apps area of WINCON Library 10 under the file ws-ftp.zip.

One of WS-FTP's unique features is its ability to track and store commonly used locations/directories for easy call-up and connection. It comes with a collection of preconfigured FTP sites for WinSock clients.

The software also has a new feature that allows a user to attempt multiple reconnection attempts for a busy FTP server. We also heard that WS-FTP will be part of an upcoming Internet Windows suite from IpSwitch, Inc.

## BONUS PICK

Thanks to Mosaic Communications Corp. and the Windows User Group Network (WUGNET), a prerelease version of NetScape 0.9 is available on WINCON Library 10 under Internet/WinSock Apps. This is a hot new Windows-based World-Wide Web browser and navigator.

## CompuServe

To participate on the Windows Connectivity Forum, type **Go Wincon** at any ! prompt on CompuServe. For those of you who are not CompuServe subscribers, *Network World* and the Windows Users Group Network are offering a free membership signup by calling (800) 524-3388. Ask for Operator 426.

## Telephony

Continued from page 23

project on the back burner.

"We'll probably get around to it some time in the second half of next year," said Hal Denton, vice president of marketing for PBX maker Intecom, Inc. in Dallas.

## USER APPEAL

The new version of NTS has won some approval in the user community — at least among large Definity G3 PBX sites, some of which were discussed by AT&T at a press conference here.

Version 2 includes a traffic monitor that lets users track the traffic between their PBX and NetWare servers. The monitor will help managers of large call cen-

ters watch for incoming call bottlenecks and to reroute calls to avoid the problems.

NTS now also includes enhanced integration with the NetWare Directory Services (NDS) facilities in NetWare 4.X.

Converting the NTS directory to NDS will tell NTS applications which PC is connected to which phone line, and give users a single logon for both NTS applications and NetWare, according to John Dubiel, manager of planning and technology at utility company Boston Edison Co., the initial customer for NTS Version 1.

Catering to the interests of ISVs, Novell and AT&T have also added a number of new client versions, including UnixWare, IBM OS/2, Apple Computer, Inc. Macintosh and Microsoft Corp. Windows NT.

NTS Version 1 only had support for Windows clients. ■





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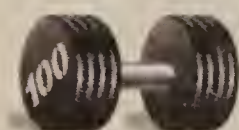




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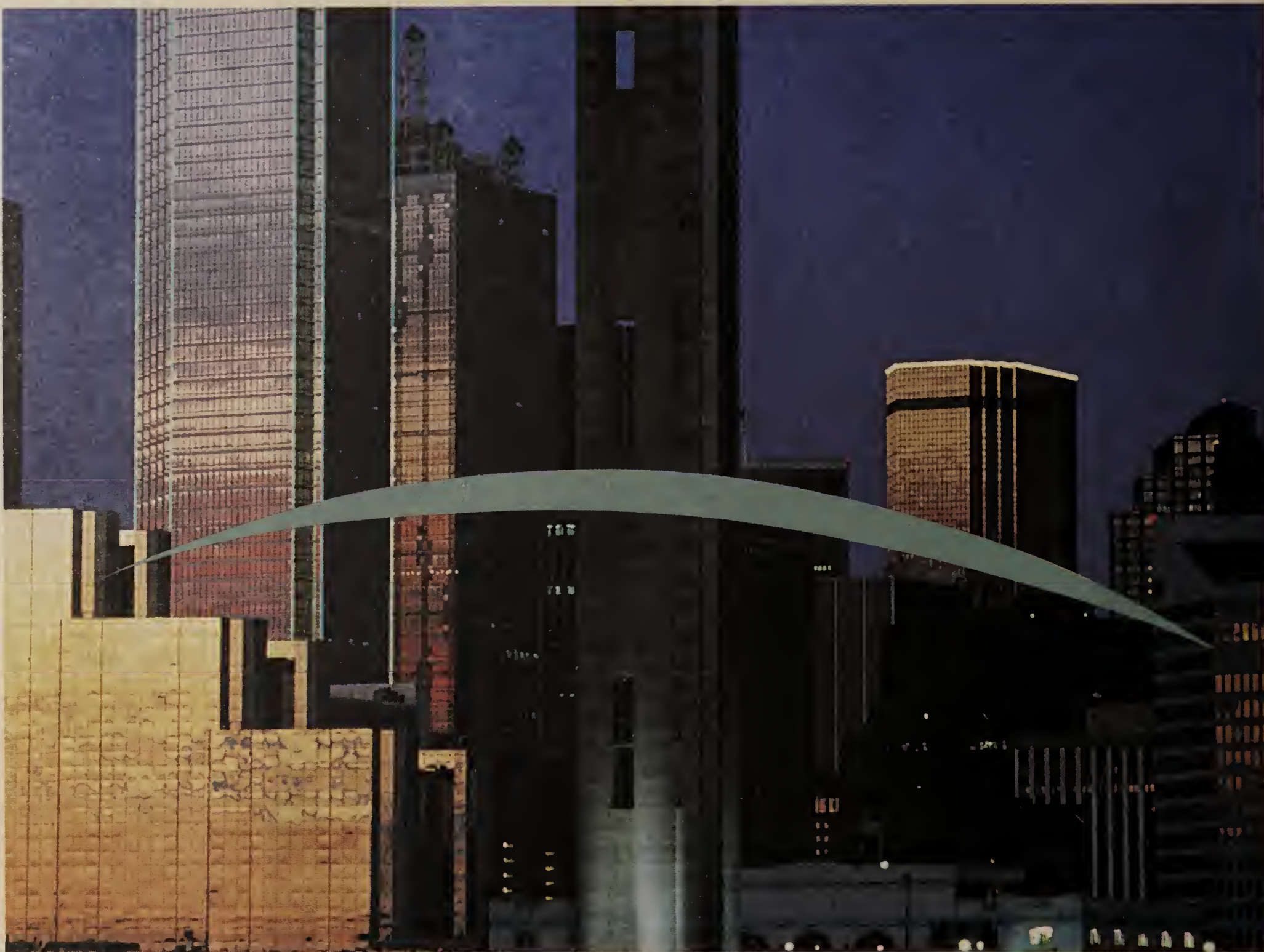
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With Altair VistaPoint, you can link LANs on different floors, in different buildings or separated by barriers such as highways, railroads, or rivers.

The Altair VistaPoint is also an ideal solution for emergency backup and disaster recovery because it eliminates the possibility of a severed cable crippling your network. With

additional hardware, your primary wired link can automatically switch over to the Altair wireless bridge to avoid loss of critical data when disaster occurs.

Based on Motorola's proven Altair® technology, the Altair VistaPoint delivers secure and interference-free communication over 18 GHz radio frequencies. Of course, the Altair VistaPoint is fully compliant with IEEE 802.3 and supports all your network operating systems and protocols.

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8.9 million hubs will be sold this year.

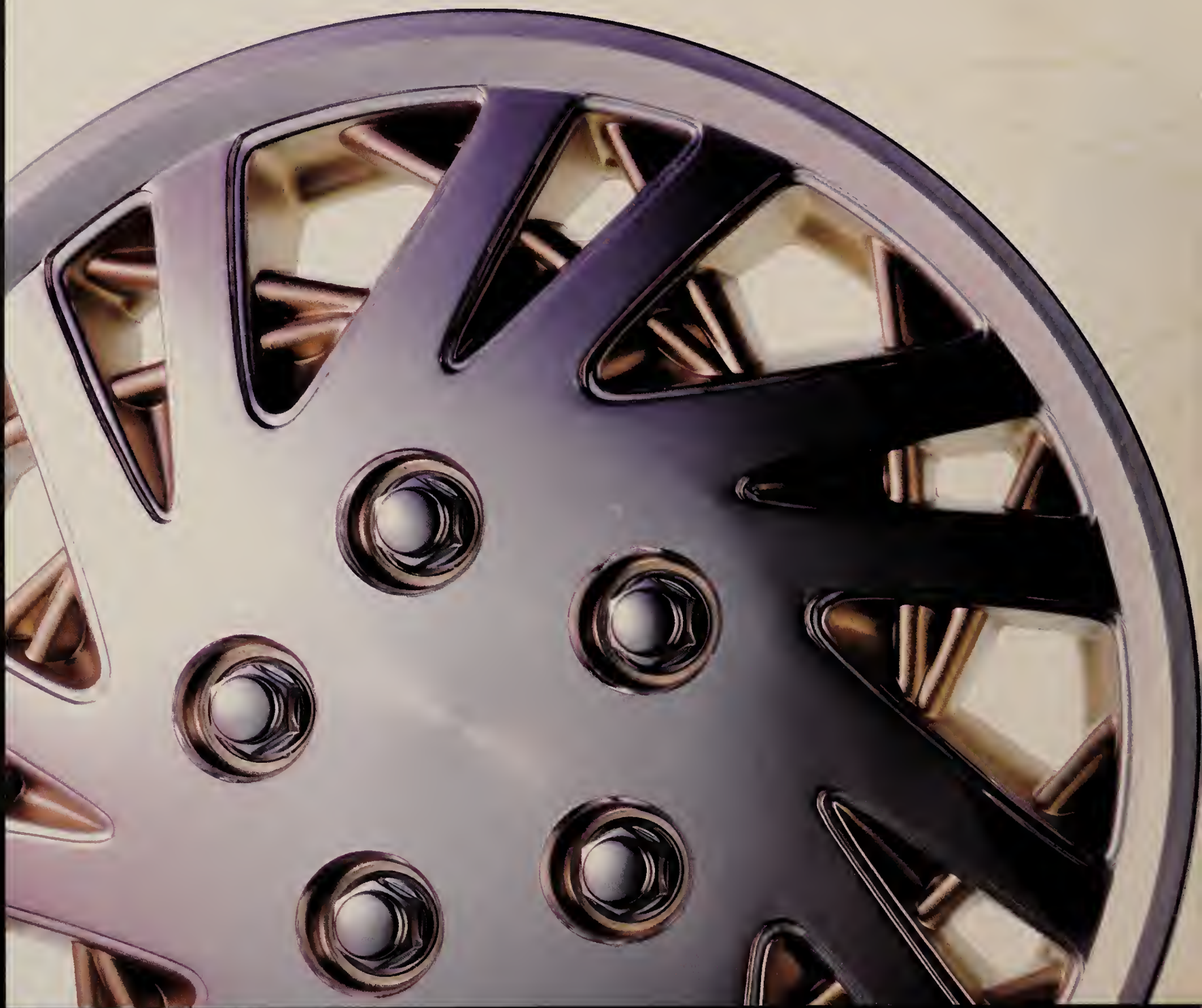


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In selecting a hub, it is critical to determine which one fits your current requirements, yet is flexible enough to grow with your changing needs. To make that decision, we suggest you consult with one of the networking experts at IBM Direct.

This brochure highlights a sampling of IBM's hub family, but virtually the entire product line is available through IBM Direct. Your IBM Direct specialist will quote you the latest, most competitive prices on IBM hubs. Be sure to ask about our special introductory offer of 25% off on selected new models!

At your convenience, you can get the information you need *and* place your order over the phone. IBM Direct lines are open 8 a.m.- 8 p.m. (ET), Monday through Friday. Call today: 1 800 IBM-CALL (1 800 426-2255).



### New from IBM: Intelligent Ethernet and Token-Ring hubs.

Given the explosive growth in networking, it's no surprise that LAN administrators need help managing their environments.

IBM introduces three outstanding new helpers: the IBM 8224 Ethernet Stackable Hub and the IBM 8230 Token-Ring Controlled Access Unit (Models 3 and 13).

These intelligent hubs bring cost-effective, centralized management to the smallest workgroups. And their modular design allows them to grow as you grow. All models support SNMP network devices, so you can monitor and control remote workgroups from a single workstation with programs such as NetView®/6000.

**1 800 IBM-CALL** 



# Affordable hubs for v



## 8224 Ethernet Stackable Hub

The new IBM 8224 is a premier remote site and workgroup Ethernet hub with stackable units of 16 10BaseT ports each, plus an optional media expansion port that can connect to an existing 10Base2, 10Base5, or fiber Ethernet network.

An 8224 Model 1 is an unmanaged (yet manageable) unit that can be stacked up to ten together in a standard rack or on a desktop. Model 2, with an SNMP agent, can manage a stack of nine Model 1s, to provide a total of 170 ports. And, unlike most competitive hubs, stacked units can be separated by as much as 250 feet. The 8224 also accommodates LAN growth with cascading through the media expansion port. To alleviate congestion, you can also segment an 8224 stack to isolate bandwidth-hungry servers and workstations.

The 8224 supports out-of-band management of a remote site via SLIP protocols. It supports SNMP MIB II, the hub repeater MIB, and the Novell® Repeater MIB, with management by DOS or AIX® applications, and SNMP over IP and IPX for management in a TCP/IP network and Novell NetWare® Management Station. For mission-critical applications, a second Model 2 can provide management redundancy.



## 8222 6-Port 10BaseT Workgroup Hub

Now you can add an entire workgroup to your LAN without rewiring. Ready to concentrate inexpensive, twisted-pair wiring, the IBM 8222 allows you to link as many as seven PS/2® or PS/ValuePoint™ computers or compatibles to a new Ethernet 10BaseT LAN. Six additional computers can be linked with each 8222 cascaded through either AUI or 10BaseT ports.

In addition, the 8222 hub automatically disables (partitions) any port connected to a station causing repeated collisions, then re-enables the port when the condition clears.



# orkgroups of all sizes.



## 8230 Token-Ring Controlled Access Unit (Models 3 & 13)

The new IBM 8230 Token-Ring Controlled Access Unit (Models 3 and 13) brings intelligent manageability to small workgroups at a very competitive price per port. These newest members of the IBM 8230 family of intelligent concentrators also offer granularity and modularity that make them remarkably versatile and expandable units.

A new 8230 can perform as an affordable, entry-level workgroup concentrator for just a handful of devices or as a completely managed, full-function, 80-node hub with dual ring redundancy. You can configure it with 2-, 3-, or 4-port Lobe Insertion Units (LIUs) that plug easily into the base unit for more port capacity as needed. Also available are 20-port Lobe Attachment Modules (LAMs) and remote 16-port LAMs for linking network devices a full 200 meters from the base unit.

With a new 8230, you can manage your Token-Ring LAN via LAN Network Manager, or an SNMP manager such as NetView/6000. Enhanced error and status displays help you identify problems fast. And for LANs requiring extra reliability, an optional dual ring redundancy feature is available for use with Ring-In/Ring-Out modules.



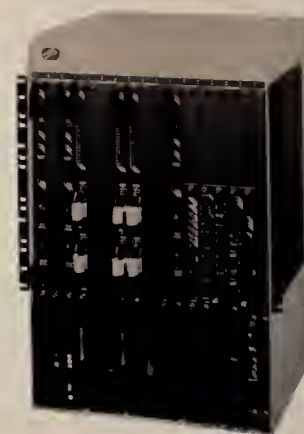
## 8228 Multistation Access Unit

The IBM 8228 is a reliable, cost-effective hub for quickly and easily connecting up to eight devices to a 16 or 4Mbps Token-Ring network. This passive unit is ideal for interconnecting with other hubs to create larger networks using IBM Cabling System (ICS) connectors.

It takes up very little real estate and can be located in a wiring closet, on a desktop, on a wall, or in a standard 19-inch rack. The 8228 offers Ring-In/Ring-Out (RI/RO) ports for added flexibility. It also supports STP and UTP cabling.



# High.



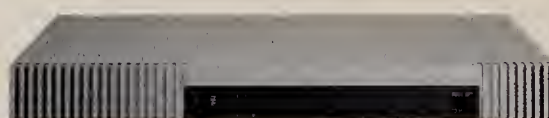
## 8260 Multiprotocol Intelligent Switching Hub

The new IBM 8260 "super hub" is the platform for the next generation of high-speed networks. It provides for easy migration to asynchronous transfer mode (ATM), multimedia LANs and other technologies that require very high bandwidth.

The 8260 chassis accepts all media and interconnect modules from an IBM 8250, so it will protect your existing network assets.

With an advanced passive backplane architecture extending that of the 8250, the new 8260 manages multiple segments concurrently. This very high density system can handle up to eight Ethernet, 17 Token-Ring or eight FDDI networks in a single 17-slot, fully managed hub.

Beyond its leading edge, ATM-ready design, the 8260 introduces the Intelligent Power System, with as many as four power supplies, that dynamically distributes the load evenly among all sources. The 8260 also introduces a new Distributed Management Architecture, enabling concurrent management of multiple LAN segments.



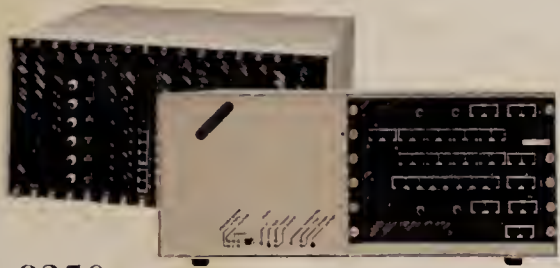
## 8235 Dial-In Access to LANs Server

Extending enterprise network resources to mobile computer users is now easier than ever. With the IBM 8235 Dial-In Access to LANs Server (DIALS), remote users can have full, transparent access to all your network services from any location that has dial-up phone service.

The 8235 DIALS is a high-performance, multiprotocol, multipoint remote networking server that provides full-function Token-Ring or Ethernet connections. It supports protocols widely used in NetBIOS, NetWare, 3270 SNA, and TCP/IP.



# performance choices that fit expanding networks.



## 8250 Multiprotocol Intelligent Hub

The advanced IBM 8250 is versatile enough to protect your current LAN investment and serve as the cornerstone of your network for the future. An 8250 lets you create and connect LANs, change configurations, switch users and perform other tasks without major rewiring.

Build the 8250 system that fits your environment with your choice of more than 50 modules (concentration, interconnection and management), plus powerful management via NetView/6000.

The 8250 simultaneously supports Token-Ring, Ethernet and FDDI topologies over a wide variety of media. For future upgrades or changes, just add new "hot-pluggable" modules to your existing hub.

Management options include centralized or distributed, out-of-band locally or remote, in-band through SNMP, and remote log-on via TELNET from a TCP/IP station.

8250s also include fault-tolerant features and redundancy to keep client/server LANs in mission-critical applications up and running in the event of problems or hardware failure.



## 8271 EtherStreamer Switch

Is your Ethernet LAN getting clogged? The IBM 8271 EtherStreamer™ Switch can boost network performance at a very low cost per port. This high-performance, standalone device interconnects as many as eight 10BaseT Ethernet LAN segments or a single node, transports traffic at full media speed, and extends network bandwidth from 4 to 8 times that of a single Ethernet segment. When coupled with our full-duplex EtherStreamer adapters, you can now offer 20Mbps Ethernet performance for an individual workstation or a server.







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## NET RESULTS

by Mark Gibbs

# Configuring applications for Mr. A. Verageuser

I don't trust end users. Give 'em an inch and they take a kilometer. For that reason, I'm always loathe to put complex applications on the desktop of the average user (let's call him Mr. A. Verageuser).

Why? Because the vast majority of commercial Windows or Macintosh applications are a nightmare of configuration options.

What network administrators want — hell, what they need and should demand — are network applications whose configurations can be managed on more than a per-copy basis.

Just think about it. Imagine that you've just been given a new application to roll out on your network. Then

imagine that a significant portion of the users are to have access. If your training budget is as tight as most organizations', it won't be a pretty picture.

The result of most new application implementations is exhaustion. You spend hours installing the software and

then, if all goes well, the support phones ring off the hook once users get access to the apps.

For those of you who may doubt my disastrous scenario, consider my old favorite, Word for Windows. It has 11 configurable option sets; let an overenthusiastic user loose with this application and there is the potential for instant chaos.

Now the wily network manager can reconfigure Word to make menu items and options invisible. The masochist . . . er, manager can even place the user configuration files in read-only subdirectories on the network.

But these hardly count as solutions; they wind up being like trying to dress a severed artery with chewing gum.

First, there's the problem of doing all of that customization. It's a lot of work. The network manager has to design the system, write macros and generate configuration data for each user.

Second, the resulting system needs to be tested, but it's nearly impossible to replicate reality in a test.

And third, a system of administrative procedures needs to be established to make modifications and updates smooth.

Now I don't want to pick on Word. While it is complex to build sophisticated configurations with Word, it is possible. I can't say the same for many other applications.

For example, there's a terrific E-mail application I use for my Internet messaging that I shall refer to as the App (although it is really called Eudora and made by those talented guys at Qualcomm Corp.).

The App is robust, well organized, efficient and a pleasure to use. But would I give it to the average user? Absolutely not.

I don't want Mr. A. Verageuser to even know that an option like "Ph server" exists. Let users loose with that kind of option and they won't be able to control themselves.

My idea of minimal configurability is to be able to suppress any menu entries I please wherever necessary and always have some kind of manager's backdoor available.

I want to be able to create user profiles and set specific options for users as required. I want to be able to create macros to do everything from selecting start-up directories to moving data to and from the application as required.

Listen to the vendors and you'll be told that Object Linking and Embedding 2.0, OpenDoc or whatever the flavor-of-the-week is will address this issue. Real soon.

But the reality is that what we need are applications designed to be managed on networks by network managers and not managed on PCs by the great unwashed, including Mr. A. Verageuser.

♦ Gibbs is a consultant and writer in Ventura, Calif. He also is the course director of the *Network World* Technical Seminar titled "Capitalizing on the Internet." For more information on the seminar, which continues through Dec. 7, call (800) 643-4668. Gibbs can be reached at (800) 622-1108, Ext. 504, or on the Internet at mgibbs@rain.org.

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# GLOBAL SERVICES

Voice and Data Services, Mobile Computing, Regulatory Issues and Voice CPE

## Contract dispute throws savings into question

BY DAVID ROHDE

Washington, D.C.

Tim O'Connell is delighted that he recently cut his telephone bill from about \$10,000 to \$7,475 a month, but oh, what a pain in the neck it's been.

MCI Communications Corp., which lost O'Connell's business to Allnet Communication Services, Inc., claimed that O'Connell was

backing out of a term contract early and owed \$1,000 a month in penalties for at least another year.

O'Connell, president of Productive Transportation Services Corp. in Tonawanda, N.Y., countered by filing a complaint at the Federal Communications Commission alleging that the term of the contract was actually a year shorter than MCI had claimed and, in any case, the \$1,000 a month penalty applied to a different service than the one he ordered.

The case also evolves around a claim made by O'Connell that MCI enforces its tariff provisions on a selective basis.

"The apparent source of this allegation — which MCI intends to fully pursue in discovery — is the competitor of MCI, which was successful. See *Dispute*, page 32

## Zero-CIR offers users a good deal, but how long will bandwidth last?

BY BILL BURCH

Washington, D.C.

Frame relay's zero committed information rate (CIR) offers users a potentially good deal — discounted bandwidth on an as-available basis. But the service begs the question: Will capacity be there when you need it?

For now, the answer seems to be yes. Even as frame relay becomes more popular and networks fill up, low-priority traffic is still getting

its turn with zero-CIR.

Zero-CIR is an option under which users pay a nominal fee for the capability to transmit data across a frame relay permanent virtual circuit (PVC) at speeds up to that of their access link. The catch is all frames are discard-eligible, meaning they don't go through unless there is spare network capacity. Guaranteed bandwidth costs more.

See *Zero-CIR*, page 33

## BRIEFS

**NYNEX Corp. and MFS Telecom, Inc.** have signed a seven-year agreement to provide a high-speed private data network service to **Citicorp** that will link seven Citicorp sites in Manhattan, two in New Jersey and one on Long Island by year end at speeds up to 2.4G bit/sec.

The telephone companies said the multi-million-dollar contract marks the first joint service between a regional Bell company and a competitive access provider.

Five wireless carriers have allied to deliver uninterrupted cellular service between the U.S. and Mexico. The companies are **AllTel Mobile**, **Ameritech Cellular Services**, **BellSouth Mobility, Inc.**, **CommNet Cellular, Inc.**, **GTE Personal Communications Services**, **Radlomovil DIPSA S.A. de C.V.** and **Southwestern Bell Mobile Systems**. The carriers said one benefit to users should be lower roaming fees when they travel out of their home areas.

**Metricom, Inc.** last week said it has launched its Ricochet regional wireless data communications services in **Dearborn, Mich.**, to support a wireless health information network for physicians from **Med-E Systems Corp.**

**Nextel Communications, Inc.** has signed definitive agreements for a previously announced investment in **Corporacion Mobilcom S.A. de C.V.**, a leading Mexican specialized mobile radio (SMR) operator.

The company additionally said it has reached an agreement with the U.S. Department of Justice that resolves all outstanding antitrust issues with respect to its acquisition of several regional SMR companies and its purchase of Motorola, Inc.'s SMR licenses. Plans call for Nextel to expand its digital mobile service to a national network by 1996.

**AT&T Paradyne** last week announced plans for 1995 delivery of **V.34-compliant 28.8K bit/sec** credit card-size **cellular modems** for portable devices. One version will sport both a wire-line and cellular interface, and will sell for about \$499. The other, with a wire-line link only, will cost about \$425.

AT&T Paradyne: (813) 530-8221.

**AT&T** has sued prominent reseller **The Furst Group, Inc.** in Vincentown, N.J., in U.S. District Court to stop it from using AT&T's trademarks and logo. AT&T alleges that The Furst Group leads its customers to believe they are dealing directly with AT&T and has switched direct AT&T customers to The Furst Group without clear authorization.

## Revised PCMCIA spec promises built-in flexibility

BY JOANIE WEXLER

Sunnyvale, Calif.

A revved-up version of the PCMCIA standard is scheduled to emerge today with the potential for integrating multiple communications and other functions onto one credit card-size PC peripheral.

Now called the PC Card Standard, the joint effort from the PCMCIA consortium and its Japanese counterpart, the Japan Electronic Industry Development Association (JEIDA), provides a global specification for a 32-bit bus interface that will allow developers, such as modem makers, to build into one peripheral multiple network interfaces that can operate simultaneously.

Previously, PCMCIA and JEIDA were heading down divergent standards paths — a potential interoperability nightmare, given the large mix of U.S.- and Japanese-built personal computers and peripherals. Both consortia's cards previously had performance-limiting 16-bit bus interfaces.

Users are hoping that the multi-function capability will ease access for occasionally mobile workers needing a LAN connection in their office and a wired or wireless WAN link when on the road. Others, such as Phil Evans, director of telecommunications at Perot Systems Corp. in Dallas, said the new card spec could eventually help fill coverage gaps in the patchwork of wireless services now emerging by offering support for multiple networks on a single card.

"We could go from RAM to ARDIS to cellular to PCS," he said. "While we hear about 'anytime, anyplace' networking, the 'anyplace' part isn't true today."

Evans said he is hoping that a modem card could select the strongest wireless signal in an area and use the corresponding network. Or, if one network isn't working, it could choose another for backup or choose among nets for least cost routing.

"It sounds greedy to want everything, but why not if the technology can support it?" Evans asked.

One reason could be price. For example, Sierra Wireless, Inc. markets a multifunction, stand-alone modem with interfaces for wired phone lines, Cellular Digital Packet Data (CDPD) nets and circuit-switched analog cellular nets. It costs \$1,200, which some

consider prohibitive for companies looking to deploy mobile applications en masse.

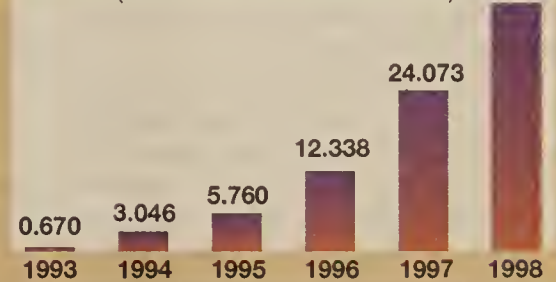
A \$500 price point for the radio portion of a mobile computing package is necessary before such applications will be broadly deployed, according to BIS Strategic Decisions, a consulting firm in Norwell, Mass.

"Getting multiple radios on a PC Card and overcoming the challenges of different electronics, antennae and interference tolerances of radios buried inside a PC are expensive tasks," said Dan Merriman, director of mobile and wireless communications at BIS.

Some observers agree that of particular use would be a card combining circuit-

### Mini-cards poised for takeoff

(U.S. sales in millions of cards)



SOURCE: BIS STRATEGIC DECISIONS, NORWELL, MASS.  
GRAPHIC BY SUSAN J. CHAMPENY

switched cellular and the user's wireless packet data protocol of choice, such as CDPD, Mobitex (used by RAM Mobile Data and other nets) and ARDIS from ARDIS Co. The reason is economics: circuit-switched cellular will remain a more cost-effective choice for long-duration, steady transmissions, while pay-by-the-packet CDPD and its alternatives will be less expensive for short, bursty applications.

"My belief is that you'll have circuit-switched and CDPD together; they have the same frequencies and many synergies," said Bob Scott, manager of wireless data development at modem maker AT&T Paradyne.

Bob Brockman, vice president of commercial marketing and sales at Cincinnati Microwave, Inc. (CMI), said he envisions a wired connection plus a CDPD interface on a PC Card.

CMI today builds a stand-alone CDPD modem and plans to move its technology to PC Cards, Brockman said.

Motorola, Inc. said it is developing wireless PC Card modems supporting ARDIS and CDPD — both packet technologies — which will ship in 1995. Motorola owns the ARDIS network.

Both Brockman and Scott view having two packet radio interfaces on one card as unnecessary.

"If CDPD lives up to its billing, it should obviate the need for a RAM or ARDIS interface; you won't need multiple ways to do the same thing," Brockman said. □



# Video over cellular makes TV news

BY JOANIEWEXLER

Springfield, Va.

Footage of plane crashes and ribbon-cutting ceremonies on Newschannel 8 in Washington, D.C. these days probably appear as ordinary video clips to the casual observer. But many of them reflect an innovative use of the cellular phone network.

The cable television station and its sister station, KTUL in Tulsa, Okla., are using circuit-switched analog cellular phone lines to

The four 9.6K bit/sec cellular lines together approximate the throughput of a single 28.8K dial-up wired telephone line, according to Roger Cooper, a field development coordinator at Colby.

Software in the Colby field unit monitors the progress of the transmission across each cellular link, then merges the signals in a \$10,000 Colby base unit at station headquarters. From there, the footage can be edited or played back.

Failsafes in the Colby field unit will enable it to automatically take action such as redialing and retransmitting if a connection is broken or degrades, Cooper said. A crash recovery feature allows the unit to pick up where the transmission left off in the event of having to reconnect, he added.

The Colby unit does not yet support interfaces to any of the emerging digital circuit-switched protocols, such as Code Division Multiple Access and Time-Division Multiple Access (TDMA), though BAMS supports the U.S.-standard TDMA flavor, IS-54.

Cooper said digital cellular lines could increase the throughput because fewer error corrections would be necessary and the digital networks would likely offer higher transmission speeds than analog links.

Newschannel 8 and KTUL are not the first to investigate getting a competitive video leg up with cellular. WTMJ, Inc. in Milwaukee has been running a similar application for nearly a year using equipment based on JPEG (MPEG's predecessor).

According to the station, it is getting quality comparable to that of a home video (NW, April 4, page 27) and hopes for an improvement in that area with the advent of digital technology. □

With cellular complements		
Newschannel 8 in the Washington, D.C. area is supplementing its satellite video capabilities with cellular technology for hard-to-reach sites.		
	Satellite	Cellular with Colby Systems compressor
Cost	About \$15/min	About \$2/min
Quality	30 frame/sec	30 frame/sec
To send 1 minute of video to newsroom	Near-instantaneous	About 8 min
Accessibility	Limited (need satellite truck)	High (compressor, cell phones fit in car)

supplement their satellite and sneakernet methods of transporting full-motion video clips to station headquarters.

The keys to the application are a portable MPEG-1 compression unit from Colby Systems Corp. in Palo Alto, Calif., and cellular services from Bell Atlantic Mobile Systems, Inc. (BAMS). MPEG-1, the newest standard for video compression, scrunches signals at a ratio of up to 167-to-1 in the Colby implementation, according to the company.

## SUPPLEMENTING SATELLITE

Newschannel 8, which has been running video over cellular for only a couple of weeks, is using the technology for locations that are difficult to reach in a satellite vehicle and too far from headquarters to drive the tape back in time for the next newscast.

"We're not using cellular to replace satellite [or hand-delivery]; we're using it in places where it is not practical to get a satellite van in," said Newschannel 8 spokeswoman Michelle Brafman.

She said at least two stories during the first week of use would not have had video clips to accompany them without the cellular application.

The cable station got started with video-over-cellular late last month and described the video transmitted via cell phone as Beta-quality, or about the same as that of satellite. Both technologies transmit about 30 frame/sec, and the cellular alternative is generally less expensive, Brafman said.

A potential downside to using cellular in lieu of satellite — depending on how close a news crew is to deadline — is that satellite transmits the video almost instantaneously, while the cellular alternative takes about eight minutes to transmit one minute of video (see graphic).

The Colby DR-3000 Portable MPEG Digital Video Recorder receives the video stream from a camera or other source, compresses it onto a personal computer hard drive in a \$40,000, briefcase-size field unit, then transmits it to headquarters using up to four dial-up cellular phone lines simultaneously.

# Dispute

Continued from page 31

ful in winning Productive Transportation's business," said MCI attorneys Gregory Intoccia and Donald Elardo in their response submitted last week to the FCC. The attorneys labeled the claim "unsupported" and "insupportable."

## FROM THE BEGINNING

The case started back in April 1991, when Productive Transportation signed up for MCI's Value Insurance Plan (VIP) for both Vision outbound dialing and 800 inbound dialing. The term ran for one year, and discounts applied if outbound and inbound calls each totaled at least \$1,000 a month.

Before the term expired, a manager at Productive Transportation's office signed up for an extension. Whether this extension was for an additional year or an additional two years is at the center of the dispute. It was labeled an "upgrade from a one-year to a two-year VIP," leaving the terms ambiguous.

O'Connell chose to interpret this as meaning two years from the beginning of the initial term. MCI chose to interpret it as meaning two years from the expiration of the initial term.

Then Allnet and other carriers started pitching the company on calling plans with discounts much deeper than what MCI was offering. Productive Transportation switched its outbound calling to Allnet around April 1993 — two years after the MCI contract began. The company kept its 800 dialing with MCI.

Then MCI started enforcing penalties.

Although Productive Transportation continued to pay MCI over \$1,000 in usage charges for the 800 traffic that continued to be carried by MCI, MCI then informed Productive Transportation that the company was not billing above the minimum usage requirement of \$1,000 per month for the outbound service. So, in turn, it assessed Productive Transportation an additional \$1,000 per month.

## OUTBOUND JUMPS IN

In essence, MCI argued that the \$1,000 minimum charge applied separately to both outbound and inbound calling.

And MCI said the penalty was valid because the tariff clearly states that \$1,000 a month is the penalty for the outbound VIP program. Productive Transportation said the tariff

at the time only referred to a \$1,000 penalty for the VIP Plus program, which the user claims was a different program.

Productive Transportation eventually switched its 800 traffic to Allnet. The complete Allnet deal not only takes advantage of lower rates, but also provides a dedicated T-1 access line to Allnet's point of presence. That T-1, costing about \$475 a month, is added to Allnet's charges of about \$7,000, giving O'Connell the more than 25% savings he is now enjoying — if he can get the MCI penalties waived.

O'Connell said MCI representatives intimidated him

and his staff when they indicated their desire to shift to a different carrier. Intoccia refused further comment beyond the formal response to the complaint filed with the FCC. □

## Comments?

See "How to reach us" on the back page.

### Savings that are worth a legal wrangle

Combined monthly outbound and inbound 800-usage fees at Productive Transportation:

Before, under MCI contract:

\$10,000

After, with Allnet service:

\$7,475

Total savings:

\$2,525 per month

GRAPHIC BY TERRI MITCHELL

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by Eric Paulak

## Are long-distance rates really going up?

**I**t's been one week since AT&T raised its private-line rates, and by the end of this week, AT&T will have raised international rates to 23 countries.

MCI last week matched the private-line cost hikes across the board. The moves are giving credence to Bell company cries that there isn't much competition in the long-distance market.

AT&T counters by saying its overall rates are lower now than they have ever been. MCI and Sprint say the same thing.

But how can this be? AT&T, for example, has implemented major rate increases on large portions of its services about every four to six months for the past two years.

Standard tariffed month-to-month private-line rates have increased as much as 18% over rates 15 months ago, and standard switched rates are up as much as 15% over the same time period.

So how can AT&T claim that its overall rates are lower?

Ask someone who has signed a contract tariff, a Tariff 12 deal or a service promotion — options that lessen the impact — and they might agree with AT&T.

But if you ask someone who is still paying

standard tariff rates from AT&T — or MCI or Sprint — all you're going to hear are complaints.

The truth is that AT&T's rates have gone up at unprecedented levels. But AT&T and the other major carriers have also been doling out promotions, contracts and other special deals that have more than counteracted some of the rate increases.

And the more users sign up for special promotions or contracts, the more people are paying lower-than-average rates and the lower the overall average gets.

For example, on the consumer side, AT&T says 52.4% of its total volume is now at discounted rates under various savings plans. In 1990, discounted minutes only accounted for 20% of the volume; in 1984, the figure was less than 5%.

So just based on the amount of discounted traffic — never mind that actual rates are lower — the overall average rate has gone down, as well.

On the business side, AT&T claims the overall average cost of an 800 call is now 71% cheaper than it was in 1984. If you look at the average tariffed rates, however, there isn't that big of a difference.

The difference comes, however, because in 1984, AT&T basically had one 800-service offering and you paid for it from month to month.

Currently, you can get standard 800 Service, 800 Starterline, 800 Readyline and Megacom 800. In addition, most other services — except the WATS services — have 800-service options.

In addition, every one of these services has term and volume discounts.

And just about everyone can be had under a contract tariff for even greater term and volume discounts.

As a result, AT&T's contract tariffs are really starting to add up. In the last week of October alone, AT&T filed 34 new contract deals, which brings the year-to-date total to 853.

The promotions are also starting to add up. There have been 270 service promotions offered by AT&T, MCI and Sprint during the last 15 weeks — an average of 18 per week.

These promotions range from gaining points for a trip to Disneyland to usage credits and discounts that can amount to hundreds of thousands of dollars.

For example, MCI is offering a onetime credit of 5% to 15% off of your annual 800 calling volume if you commit to a one- to three-year VIP Plus service plan between now and Dec. 31. The maximum credit allowed is \$240,000.

So all the marketing hype really could be true — average rates are cheaper now than ever. But that's only the case if you're taking advantage of every offer out there.

If you're not, you going to be stuck with ever increasing rates that have to keep rising to pay for the discounts that everyone else is getting.

**The promotions are also starting to add up. There have been 270 service promotions offered by AT&T, MCI and Sprint during the last 15 weeks — an average of 18 per week.**

♦ Paulak is associate publisher for the Center for Communications Management Information, a provider of rate and tariff information in Rockville, Md. He can be reached at (301) 816-8950, Ext. 327.

## Zero-CIR

Continued from page 31

MCI Communications Corp. and Sprint Corp., the two major long-distance carriers that offer zero-CIR, both said they are sending discard-eligible data along at a steady rate.

At Sprint, 93% of the PVCs the carrier sets up are for zero-CIR, said Brad Hokamp, a frame relay product manager. In theory, all that traffic is discard-eligible, but Hokamp said more than 99% of it is going through.

### RUSSIAN ROULETTE

The percentage of frames discarded is important to any company that occasionally needs to burst above its CIR — no matter what that CIR is — because burst data is treated just like zero-CIR traffic: It is discard eligible.

But carriers appear to have network capacity available, and users are getting away with minimal financial commitments. Lithonia Lighting, an MCI customer in Conyers, Ga., does not use zero-CIR but frequently bursts above its PVC CIRs, which range from 56K to 512K bit/sec. When Lithonia has bursted above those CIRs, the company has seen 99.7% of its discard-eligible packets go through, according to Brad Bisel, a net manager with Lithonia.

Initially, network capacity was available for bursting simply because frame relay had few users. Today, the service's increasing popularity means carriers have to engineer spare capacity into the network. Sprint tries to keep the network running at 70% of network capacity, Hokamp said.

"Whether we have 500 customers — as we have today — or 3,000, as long as we're engineering our network properly and monitoring that utilization on a daily basis," network crowding won't be a problem, Hokamp said.

### IS IT FOREVER?

Some analysts doubt carriers will forever resist loading their networks up. Carriers may say they'll continue to keep spare capacity on the network, but they have a financial incentive to overbook, said Christine Heckart, a senior consultant with TeleChoice, Inc. in Verona, N.J.

"That's the way I think carriers make money — by oversubscribing and overselling a frame relay service, not by undersubscribing and underselling it," she said.

Sharing her doubts is frame relay user Brian Spears, manager of information technology for Konica Business Machines USA in Windsor, Conn. Carriers are doing a good job now, but "whether they'll continue to be able to deliver packets that are discard-eligible at that rate is another story," Spears said.

If networks do get loaded, users will have to pay to upgrade zero-CIR PVCs to a higher speed line that can guarantee throughput. In a way, that's how it should be, said Rosemary Cochran, a principal with Vertical Systems Group, a consultancy in Dedham, Mass. The original premise behind zero-CIR was that users paid less because there was no bandwidth guarantee, she pointed out.

But for classic zero-CIR applications such as shuttling around low-priority traffic during off-hours, the option still makes sense, said Laura Capalini, a principal with Northpoint Consulting in Reston, Va.

"If you have a lot of nighttime usage, that zero-CIR is probably going to suffice for quite some time, even if the network is starting to see some peaks during traditionally busy hours," Capalini said. □

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# CLIENT/SERVER APPLICATIONS

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## Sybase makes a data warehousing play via acquisition

BY BARB COLE

Emeryville, Calif.

Sybase, Inc. last week said it has acquired a maker of query acceleration software that will be exploited in the next version of SQL Server.

Waltham, Mass.-based Expressway Technologies, Inc., which Sybase bought last month for an undisclosed sum, sells Expressway 103, a server-based query accelerator used in data warehousing applications.

Data warehousing involves collecting large amounts of data from several sources and making it

### Miniprofile

**Company:** Expressway Technologies, Inc.

**Based:** Waltham, Mass.

**Founded:** 1975  
(as Henco Software)

**Employees:** 25

**Primary product:** Expressway 103, a \$25,000 decision-support query accelerator that works with Sybase SQL Server, CA-Ingres, Oracle7 and Informix On-Line.

available on a server to end users equipped with client-based decision-support applications.

Sybase officials would not say specifically how the Expressway technology will be used, but they expect the first Sybase products incorporating Expressway

103 technology will be announced by year end.

Berl Hartman, Sybase's vice president of product marketing, said the acquisition fits well with Sybase's strategy to add support for data warehousing and faster queries in the next major release of SQL Server, dubbed System 11. The new database will also support larger amounts of data, she said.

Poor query performance and the inability to support databases containing hundreds of gigabytes of information have kept SQL Server and its competitors from being widely used for data warehousing applications, according to analysts.

But the database vendors need to focus on the market since data warehousing will continue to grow in popularity as better front-end tools emerge and more end users request access to data, analysts said.

Sybase already sells a \$140,000 product called Navigation Server — an add-on to SQL Server — to handle large decision-support applications. Navigation Server runs only on parallel processing computers, however, and has been criticized for being difficult to set up.

"This makes you wonder if Sybase is admitting that Navigation Server is more difficult to use than they thought it would be. It seems like they're pulling query optimization back into the core database," said Dan Kusnetzky, an analyst at International Data Corp. in Framingham, Mass.

Expressway uses bitmapped indexes — the same technology used in Microsoft Corp. FoxPro and Red Brick Systems, Inc. Red Brick Warehouse — to speed up queries by as much as 20 times.

Expressway works with databases from Sybase, Oracle Corp., Computer Associates International, Inc. and Informix Software, Inc.

©Sybase: (510) 922-3500.

## New E-mail group chairman promises to bring user issues to the forefront



The Electronic Messaging Association (EMA), an organization that promotes the ubiquitous use of electronic mail, recently put a user in the driver's seat. For the next two years, Steven Mahaney, manager of electronic messaging infrastructure at Smith-Kline Beecham, plc, will be chairman of the EMA's board of directors. *Network World* Staff Writer Jodi Cohen last week spoke to Mahaney about key issues facing EMA members, including the emerging electronic commerce market and the EMA's role in monitoring legislative activities.

**Your election as chairman of the board represents a shift in EMA's makeup. What is the significance of users holding the majority of elected offices within the EMA?**

It's an interesting trend in that user companies are taking a more active role in the association — both in terms of committee participation and leadership.

Also, there is a focus now on users developing technology and helping define the direction in which it moves. In most cases, messaging or electronic commerce technology are not representative of the core businesses of these companies, rather it is a business tool. [The fact that users are devoting resources to forward the technology] really speaks to the significance of that set of tools.

**What are the EMA's priorities over the next 12 months?**

One of the more notable trends is the association's shift in focus on messaging from the standpoint of international standards [such as X.400 and X.500 to the Internet, which is being used more and more by

**T**he EMA has made the swing away from a focus specifically on electronic mail and is now dealing with all aspects of electronic commerce."



**Steven Mahaney**  
Chairman of the EMA board

corporate America]. There are a number of activities going on within the Internet Engineering Task Force to enhance the reliability, security and functionality of messaging across the Internet. [These activities] move what were two distinct camps — the standards community and the Internet community — closer together.

Another trend is the focus on messaging

and electronic commerce on a global scale, as evidenced by the formation of numerous new sister associations to the EMA [in other countries].

The other area that we've taken a very active role in is monitoring and helping to influence legislation. The focus to date has largely been in opposing legislation — typically from the U.S. Congress — that is viewed by the industry as limiting or prohibitive to the proliferation of messaging. While we understand the need of law enforcement agencies to do their jobs, it should not be at the expense of companies [being able] to do business.

**What do you think of government efforts to regulate messaging?**

I hate to categorize it totally in the negative. The main caveat is if it makes sense and is not limiting to

the utilization of the technology, then there may be some appropriateness to it. But to the point that it causes expense to companies to implement restrictions imposed by legislation — for example with the Clipper Chip issue — [or restricts what you can do] with the technology, then both personally and as an industry, we're opposed to that.

See Mahaney, page 38

### BRIEFS

**Axonet, Inc.** of Harvard, Mass., last week announced **workflow** software designed to run over TCP/IP. The company's Axonet MegaFlow offering includes a graphical tool to build electronic mail-based rules for routing information, forms and files across a network. The software links Windows clients with AIX, HP-UX, Ultrix, SunOS, Solaris and Unix V servers. Pricing starts at \$995 for a five-user license.

Axonet: (508) 772-3590.

**SoftArc, Inc.** of Markham, Ontario, last week announced a new software module that enables its First-Class **bulletin board** clients and servers to interact via TCP/IP. The software supports Macintosh and PowerMac servers as well as Macintosh, Windows and OS/2 clients. Pricing for the new module starts at \$995.

SoftArc: (915) 405-7000.

**Information Electronics, Inc.** of St. Simons Island, Ga., last week

announced **Windows NT**-based gateways between the Internet and a variety of proprietary electronic mail systems. The firm's PostalUnion/SMTP can act as a gateway between the Simple Mail Transfer Protocol and Lotus Development Corp. Notes, Microsoft Corp. Microsoft Mail and CE Software, Inc. QuickMail. A module for Lotus cc:Mail is under development. The software supports Multi-purpose Internet Mail Extensions attachments, as well. Pricing starts at \$1,000 per server.

Information Electronics: (912) 638-1893.

**Enterprise Solutions, Ltd. (ESL)** of Westlake Village, Calif., last week said its British subsidiary released a reference implementation of a new standard for **X.400 over dial-up lines**. Specifications for the new standard, to be called X.445, are now being distributed to vendors that belong to the Asynchronous Protocol Specification Alliance. Group members include value-added net providers and makers of X.400 routers and gateways.

ESL: (805) 449-4181.

### DEVELOPMENT TOOLS

## PacBell sees Vision as good apps builder

BY ADAM GAFFIN

Concord, Calif.

David Fast didn't want to be slowed down by the intricacies of designing new cross-platform client/server applications.

So the Pacific Bell technical manager recently began testing a beta version of Unify Corp.'s Unify Vision 2.0 tool kit, which promises to speed development, in part by freeing him from building a different interface for each client platform. The tools pretty much eliminate the need for developers to worry about what network protocols the applications will run over, too.

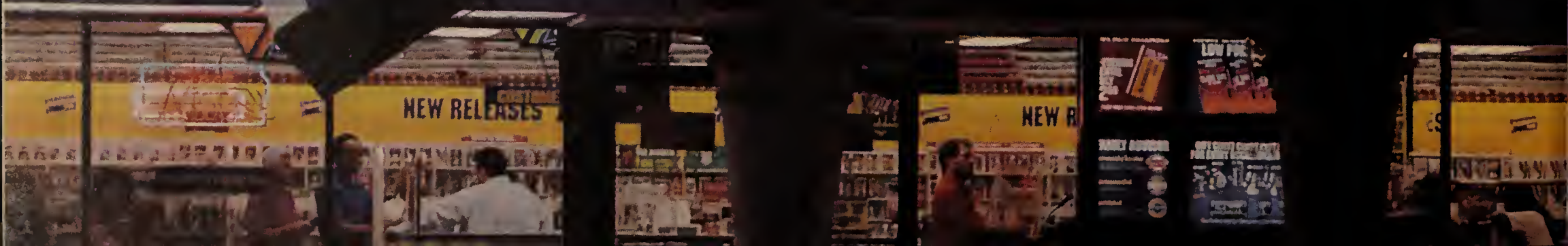
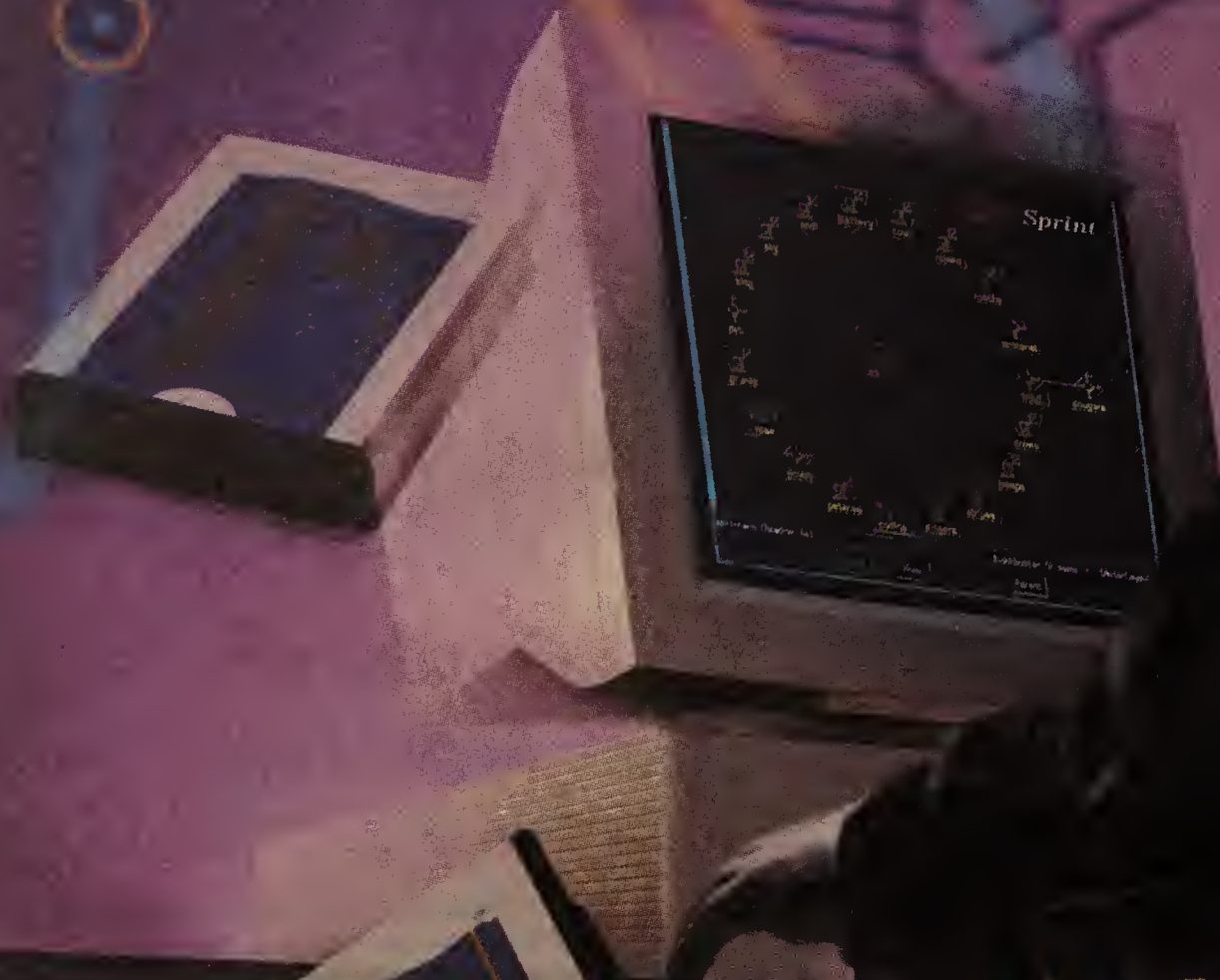
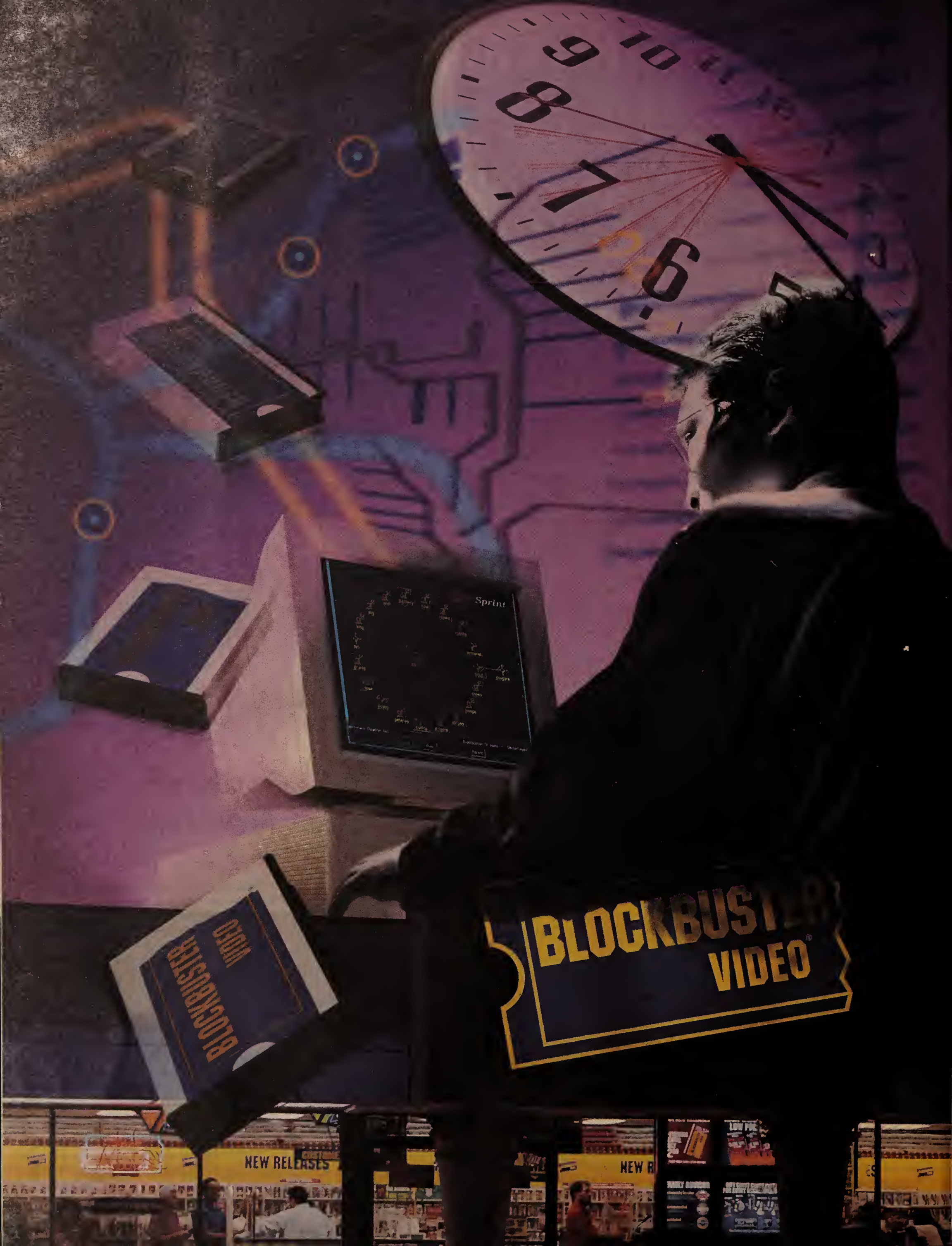
Fast has been so impressed with the software that he is not even waiting for the general release in January to roll out his first production application. He hopes to have that application — one for monitoring customer complaints and service delivery — in action within a month.

Unify Vision uses object-oriented techniques and application partitioning to generate software links

See PacBell, page 38

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***Business***



# Powersoft preps cross-platform application development tools

Competitor Blyth unveils data access software.

BY ADAM GAFFIN

Powersoft Corp. last week announced plans to move beyond the Windows application development tool market with a cross-platform version of its tool that supports Macintosh and Unix environments, as well.

The cross-platform support is key to Powersoft's efforts to position its software for developing enterprise network applications since so many companies support a mix of client and server operating systems.

Enterprise Series 4.0 will have a common code base for its Windows, Macintosh and Unix versions. That will enable corporate developers to build and deploy applications on machines running any of those operating systems.

Applications developed with Version 4.0 will also interoperate with applications built with earlier versions of the software.

The initial Macintosh version is aimed at

Motorola, Inc. 68000 processor-based platforms, with shipment scheduled for the first quarter of next year.

In the second quarter, the company will release Version 4.0 tool kits for HP-UX, AIX and Solaris machines.

The Windows version, due by year end, will come in a series of packages ranging from those meant for individual desktop developers to those supporting team programming and integration with third-party tools and will add new templates and libraries. (NW, Aug. 29, page 31).

All of the Windows software will add support for Microsoft Corp.'s Object Linking and Embedding (OLE) 2.0 technology. This includes OLE 2.0's automation feature for linking clients with applications across a network.

Also new to the Windows line is an end-user tool, dubbed InfoMaker, that combines

the company's existing PowerVision and PowerMaker tools into a single application under Version 4.0.

Mitch Kramer, an editor with the Patricia Seybold Group, Inc., a Boston consulting firm, said Version 4.0 represents an evolution of Powersoft's product line, but he added that the company still has considerable work before rolling out true enterprise development tools.

## A BLYTH APPROACH

Separately, Powersoft competitor Blyth Software, Inc. last week announced client/server software aimed at easing access to back-end data for both end users and network administrators.

The heart of TrueAccess is a server-based proprietary object repository that contains rules and security levels for linking end users relational databases.

The server acts as a single point of access for end users and translates their requests into SQL queries.

Because all requests go through one server, administrators need to set security authorizations only once.

The repository design means that both developers and end users can reuse any data views they create.

The software supports Windows and Macintosh clients and Oracle Corp. and Sybase, Inc. databases.

©Powersoft: (508) 287-1500; Blyth: (800) 346-6647.

## FRONT-END TOOLS

# NeXT software to join object-based apps and databases

BY BARB COLE

Redwood City, Calif.

NeXT Computer, Inc. last week rolled out Enterprise Object Framework (EOF), software for building object-oriented applications that work with relational databases.

With EOF, developers can build reusable objects that can then be bound together as applications.

The objects contain business rules — rules that are typically programmed directly into databases as stored procedures. Storing business rules in objects that are separate from the back-end database means that when changes to the rules are required, developers simply change the object without touching the database.

"[EOF] provides a buffering layer," said Doug McCausland, senior manager of object technology at MCI Communications Corp. in Arlington, Va. "When we need to make data changes, we go to the EOF objects, not the database."

This greatly reduces coding time, sometimes by as much as 50%, users said.

EOF objects work with Oracle Corp. Oracle7 and Sybase, Inc. SQL Server 10 databases. By the end of the year, the product will support IBM DB2, Gupta Corp. SQLBase, Borland International, Inc. InterBase and Informix Software, Inc. On-Line databases, as well.

EOF consists of three components:

■ The Enterprise Object Modeler is used by developers to build objects and the mapping structures that link those objects to relational data.

■ A run-time module, which lets administrators deploy applications built with EOF, is available today for the Nextstep operating system. By early next year, it will be available for NeXT's Portable Distributed Objects software, Hewlett-Packard Co. HP-UX, Sun Microsystems, Inc. Sun OS and Solaris, as well as Digital Equipment Corp. OSF/1.

■ The third component, an adapter layer, enables objects to communicate with relational databases.

Objects built with the modeling tool may be deployed on client machines running on Nextstep, the database server or a separate server.

Analysts said EOF should help move NeXT out of the object-oriented niche and into more mainstream application development.

"The fact that you can use this with relational data is key. Object technology typically requires you to have a customized database," said Hugh Bishop, an analyst at Aberdeen Group, Inc. in Boston.

Available now, EOF costs \$299.

©NeXT: (415) 366-0900.

## Reality Check

**Product:** Enterprise Object Framework  
**Company:** NeXT Computer, Inc.

### The benefits:

- Lets developers build reusable business objects.
- Works with relational databases from Oracle Corp. and Sybase, Inc.

### The drawbacks:

- Applications built with the framework run only on NeXT's Nextstep operating system.
- Doesn't easily import preexisting objects built with C++.

### The user view:

"EOF lets us leverage relational databases in an object form. We'll get long-term use of our relational data while preparing for the oncoming move to objects."

Doug McCausland

## Mahaney

Continued from page 35

### What do users need from vendors to build enterprise messaging networks?

The users want directories that interoperate and synchronize with a variety of proprietary products [as well as] management facilities [for] managing networks [and applications].

### Many carriers currently price their E-mail services on a per-byte basis, a pricing scheme that can get expensive for big E-mail users. Is there a need for carriers to revise their pricing schemes? Have you seen any action taken in this area?

There's a movement in that direction and it's certainly coming at the demand of customers. As messaging technology is being used more — not just for simple text messages, but to move a variety of information objects around (formatted documents, image, video clips and sound bites) — the volumes of data are increasing geometrically. The vendors are keenly aware of the need to revise some of their tariff structures. What's happening more often is individual bulk pricing agreements [are] being negotiated on a customer-by-customer basis.

### Do you anticipate workflow and groupware becoming bigger issues for the EMA, and how will that fit in with the EMA's traditional E-mail focus?

The EMA has recognized that E-mail, while still being important, is not the sole technology that companies are looking for to help them conduct their business. They are using electronic data interchange, E-mail and fax technologies, and are incorporating a variety of underlying telecommunications facilities, including wireless technologies.

### A lot of vendors are moving to client/server E-mail systems. Is this something that user are demanding?

I don't know that we're necessarily demanding client/server applications. I think a potential benefit of client/server technology applied to messaging applications is that it tends to differentiate between the back end [or server] end of the application and the client end. This will help us to distinguish between the back-end infrastructure and the front-end client so that we can put in a common backbone and support a variety of client products.

So, it's all moving toward interoperability: ease of use, ease of management. ☐

## PacBell

Continued from page 35

between a variety of clients and server-based relational databases across a network (NW, Oct. 31, page 45).

The new Vision version lets a developer write a single set of programming code and then have it compiled automatically for a variety of client operating systems.

This is important to Fast because the end users he is supporting have machines running a mix of Windows as well as Unix operating systems from Hewlett-Packard Co. and SunSoft, Inc. The client machines connect to an Informix Software, Inc. database server over TCP/IP.

"I don't need to know if I'm going to be developing for an HP 7000 workstation or a Sun workstation or [an Intel Corp.] 486 workstation," he said. Previously, Fast would have to do recompiles for each platform.

Fast is essentially a one-man development shop responsible for bringing Pacific Bell's Network Data Products Service Center into the graphical user interface-based application age.

He decided to build his own applications because he could not find off-the-shelf software that

could easily link clients running three separate operating systems to back-end databases for customer-service, troubleshooting and service-delivery. Fast also needed the flexibility to add more databases in the future.

The Pacific Bell center, which now relies on text-based applications built with Unify's Accell application, currently has 21 users. But that number could skyrocket over the coming year, as Pacific Bell foresees continued growth in demand for the fast-packet services supported by the service center, Fast said.

Fast has yet to encounter any problems with the software, but he said it may not be powerful enough to handle particularly complex data requests.

"As long as you use standard SQL constructs, you're fine," he said.

And because Vision has an open architecture, Fast said it would be easy to add in tools that handle more complex operations.

Looking toward the future, Fast said Vision will let him build applications that can access a wide variety of relational databases. Besides Informix, the application comes with native drivers for databases from Computer Associates International, Inc., IBM, Oracle Corp. and Sybase, Inc. ☐

**Fast has yet to encounter any problems with the software, but he said it may not be powerful enough to handle particularly complex data requests.**



## SHARED LOGIC

by Marc Myers

### 'Wait a second, I'll call my replication broker...'

**W**hile data replication has appeared in the client/server market as the newest technology for distributed computing, replication is as old as the printing press.

There's nothing new about copying information to make it accessible to remote users. What's new is the terminology: replication.

My very first grunt programming job (more than 10 years ago) was to write COBOL programs that created extract files of the local IBM IMS database. These files were shipped out to remote sites that required read access to the central site's data. While this was a simple process, its theoretical basis was sound:

Update the data at a central site and distribute the extract as a read-only copy. This is single-site extract replication.

However, life can be more complex than this. Many organizations want to update the data at each remote site. They don't want to

wait to send the update to the central site, which is already bottlenecked. Rather, they want to update the data where they are and have the central site resolve the fact that their update is completely invisible to every other server on the LAN and WAN. This is called multisite update replication.

It is into this arena that products such as Sybase, Inc.'s Replication Server have entered. Sybase has solved the problem by requiring each remote site to submit asynchronous stored procedures to update the primary site, which then redistributes the update to all remote sites. Oracle Corp.'s Oracle7.1 replication server, which is in beta at several sites, according to the vendor, also handles multisite update replication. It uses an as-yet undisclosed broadcast mechanism that propagates updates from server to server without going through a primary site.

But there is a fatal flaw in multisite update replication. Because data replication as it is now implemented does not support any kind of two-phase commit protocol, two people at two different sites could try to update the same data at the same time and create a conflict. The two-phase commit protocol requires each party involved in a multiserver update to indicate first that it is ready to receive the update.

So how do we resolve the conflict? What's needed is a broker. The problem with today's replication technology is all the servers are jabbering to each other when they should be talking to a "replication broker" that can handle all the traffic. Connect each server to the broker via a high-speed link, and make the broker redundant and fault-tolerant. Then the broker can manage conflicting updates and the distribution of data to the registered remote sites.

You might object, saying that this is just two-phase commit with a different wrapper.

But it's not. Two-phase commit is handled by a collection of database servers, slowing down all the servers involved. A replication broker would be centrally located and independent of

the database servers. It would only send the servers fully scrubbed transactions.

You also might object that it would be prohibitively expensive to build high-speed links to the broker. But consider the fact that nobody has built, or as far as I know, even proposed a replication broker. By the time they actually exist, high-speed bandwidth probably will cost a lot less than it does now.

If all you need to do is send extracts to your remote sites, hire a kid fresh out of school to program it for you. But if multisite update replication is on your dance card, consider carefully the volatility of your applications. With

low volatility, conflicts will be minimal or non-existent, and the currently available technologies will be adequate. If your volatility is high, however, and you can not afford occasional updates that fail, then you would be better to stick with old-fashioned central-site updating until replication technology matures.

♦ Myers is president of Client/Server Connection, Ltd., a Cambridge, Mass., firm specializing in client/server software solutions. He can be reached at (800) 622-1108, Ext. 522, or via CompuServe at 71332,1726. Myers' column alternates in this space with that of META Group's Mike Rothman.

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## EDITORIAL INSIGHTS

### The FCC punts

Alas, I was hoping to bring this issue to your attention last week when the Cisco-Kalpana purchase popped up and into the limelight. But not to worry about timing — this problem is going to be around for a long time to come.

What we have here is a classic good news, bad news situation. First, the good news: On Oct. 20, the FCC reaffirmed its earlier video dial tone ruling allowing the RBHCs to provide video services. That's good because it means monopolistic cable television companies may face some much-needed competition, and the Bells may deliver some long-promised new services. Now the bad news: The agency left everyone hanging on whether ratepayers like you and me will foot the bill for these video ventures.



Despite urgings from consumer groups and Rep. Ed Markey (D.-Mass.) that the FCC establish firm rules on how much video investment the carriers can palm off on us, the agency issued only very general cost allocation guidelines and said it would judge each carrier's video business plans on a filing-by-filing basis.

Excuse me?

The FCC acknowledges that carriers will dump billions of dollars into these video ventures in the years to come and that customers could face substantial harm from the unfair allocation of video costs. The agency has also complained in past budget hearings that it barely has the staff and resources to handle its current job, let alone a heavier work load. So a time-consuming, error-prone approach to examining lots of new filings on a case-by-case basis is the right way to go?

In Markey's words, the FCC "has put off the most basic cost decision — who's going to pay for this."

That's unfair to ratepayers, who shouldn't be left wondering whether the FCC will catch loaded-dice allocations, and to competitors, which have to play by a different set of business rules.

Simply put, the RBHCs should have to shell out their own money — not yours and mine — and recoup their investments from customers of their new video services. Video customers should pay for video services.

All other entrepreneurs have to risk their own money in building new businesses. The RBHCs can't whine about being shackled by regulation and then hide within the regulatory superstructure when it comes time to fund their forays into new markets.

Now, the FCC has assured us that it won't let the carriers get away with subsidizing all the costs of their video undertakings. But it hasn't said exactly what it will allow them to get away with, and ratepayers need to know that.

♦ JOHN GALLANT

jgallant@world.std.com

## THE BLUE VIEW

by Anura Guruge

### IBM uses Karat to lure users into systems management

SystemView, now dressed in Mark II regalia and code-named Karat, is back. If you can even recall what SystemView was in the first place, you're likely to be unphased by this news — for now. If you do remember SystemView, you may be troubled that IBM has the audacity to talk about a Mark II when Mark I never really got beyond the printed word. The notion behind Karat, however, has such important network ramifications that users should do a mental reset and review SystemView without too many preconceived notions.

SystemView was first unveiled in September 1990 as an umbrella strategy for total systems management that embraced heterogeneous platforms and multiprotocol networks. SystemView, independent of Karat, is still all about total systems management — monitoring and managing all the information processing-related entities, including the relevant business and fiscal procedures (for example, maintenance contracts and lease payments), that are outside the network cloud. For the past decade, the emphasis has been on network management; as a result, we now have a fairly good handle on net management and an abundance of products. However, managing the network, though crucial, is but a subset of the overall management requirement.

Today, we take for granted that we can get alerts when — and, in some cases, even before — a network problem occurs. The same is not true even a small step outside the network. Management of servers, applications, workstations and databases is still in its infancy compared to network management. Being able to manage all of this, along with the network, while not forgetting the business aspects — and all from the same console using the same processes and procedures — is not easy. With Karat, IBM is setting out to create the prerequisite infrastructure for realizing this level of integrated and pervasive management.

Today, IBM users are drowning in a sea of management products that Big Blue has spawned over the past decade. IBM markets more than 150 management products, spread over four or five different platforms. In the area of NetView/6000 and LAN/WAN internetwork management alone, in which IBM is relatively strong and successful, umpteen separate and interrelated products are required to realize a total network management solution. Moreover, the onus of identifying and integrating the various products required to achieve a given management solution is left to the customer. Karat, thankfully, will eliminate this.

A key goal of Karat is to make IBM-centric network and systems management process-oriented rather than product-oriented. With Karat, a customer first selects a desired management process, such as database management, print management or software distribution. Then, Karat will not only automatically select the necessary products, which in time will include non-IBM products, but also will install them. True to a basic precept of SystemView, the installed products will also have a common and consistent, heavily icon-oriented user interface. This user interface will rely heavily on object-oriented technology, as will some, but initially not all, of the processes.

Despite all the connotations of total systems management, Karat will not be a single product. It cannot

be, given the diverse platforms with which IBM deals. There will be at least four flavors of Karat: AIX, OS/2, mainframe MVS and AS/400. Other flavors, including versions for non-IBM platforms, are also being considered. AIX will be the first to be rolled out, with general availability set for June 1995. Karat for MVS won't be unveiled until the end of 1995.

The AIX and OS/2 versions of Karat will be delivered on CD-ROM. Each CD-ROM will contain all the software for the various products required to imple-

ment the repertoire of processes Karat supports. Using a user-friendly Karat installer, a systems administrator will select the desired management processes. Karat will then determine which products from the CD-ROM need to be installed to achieve these processes. Obviously, customers will only want to pay for the processes they plan to use, rather than for all the Karat processes or all the software on the CD-ROM.

To accommodate this, Karat will display an access code once the processes have been selected and the required products have been determined. The administrator will call IBM and quote the access code, which will determine how much the customer will be billed for the software. The administrator will then be given an authorization code. Once the administrator keys in the authorization code, Karat will then install the necessary software. This type of authorization code-based software selection using a CD-ROM is now being used widely in both PC and Macintosh environments.

Karat, at least in the first year or so, will not be a fully rounded solution. For a start, the emphasis still will be on network management rather than total system management. Developing all the software to realize total systems management — even with object-oriented technology — will take time. Karat also may end up being too platform-specific. Let's say an IBM mainframe customer, on receiving the AIX version of Karat, decides to select the software distribution process. This would typically require NetView Distribution Manager software on the mainframe as well as on all the target systems. It is currently unclear whether the AIX Karat CD-ROM will include the mainframe software or, for that matter, the AS/400 or PC software.

There is another problem. Each CD-ROM will contain the code for about 150 management products. New releases of these products will become available continually. How will IBM handle this Karat-related software release management? Will Karat be a subscription service — with a new CD-ROM each month that the customer has to install? IBM is still seeking to resolve this issue.

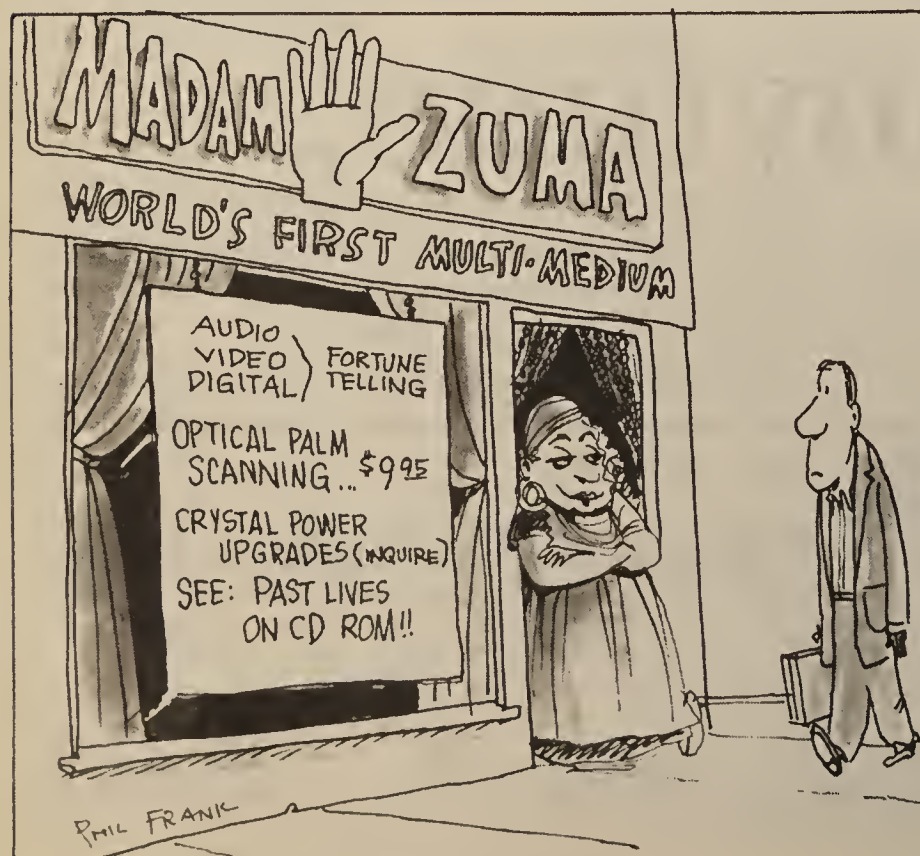
The bottom line is that Karat, in 1995, will not be the ultimate panacea for total systems management, which is the SystemView promise. That is still a way down the pike. Systems management, however, will be the new frontier for the remainder of the 1990s, so users should be planning for it now. Karat is IBM's carrot to get users to start laying the foundation for total systems management.



♦ Guruge is an independent consultant specializing in internetworking and IBM network architectures. He can be reached at (603) 878-1303 or via Internet/MCI Mail at aguruge@mcimail.com.

## TELETOONS

FRANK AND TROISE





## BUSINESS PROCESS REENGINEERING

by Linda Musthaler

### Find creative ways to apply technology

Forward-thinking user organizations look for ways to deploy technology to further business goals. One way to do this is through business process reengineering (BPR), a management trend that involves using network technology to revamp the way a company does business.

The Bank of America National Trust and Savings Association is a good example of a firm that's profited from BPR (Sept. 19, page 1). The bank's Asian Wholesale Division was using an expensive and time-consuming courier system to move paper records among its Asian branches. Costs were rising faster than revenue, and something had to be done.



The solution turned out to be new work processes, enabled by an integrated client/server system. The implementation team was charged with developing the new systems on top of an already existing network with as few modifications as possible. What's more, the team was directed not to simply automate the old process, but to come up with new and innovative ways to exchange and route information around the world.

The bank ultimately implemented imaging and workflow technology from Filenet Corp., along with custom applications designed by the bank, running locally on NetWare-based networks. Information from the custom applications was transmitted across the bank's existing WAN.

While the reengineering team worked on the new work processes, the information systems (IS) staff enhanced the network and communications to handle the new applications. IS staffers also played a key role in determining how work could be done using existing and new technology.

Admittedly, Bank of America's new imaging system is rather extensive, incorporating changes in a global environment. But an IS department doesn't have to deploy \$3.5 million worldwide systems to help its organization meet business goals. The implementation could be much simpler and less expensive, like that of Johnson Controls, Inc. (Sept. 5, page 16.)

Johnson Controls is a manufacturer of automobile parts that are used by Ford Motor Co., Chrysler Corp. and General Motors Corp. The company has just recently begun using the Internet as a strategic tool in its "just-in-time" manufacturing process for building automobile seats.

Johnson Controls' employees use the Internet to exchange computer-aided design and manufacturing files, as well as electronic mail, with their clients. Prior to adopting the Internet for communications, Big Three engineers would frequently spend late hours at Johnson Controls, making last minute changes to the design specifications. Now the engineers can make the changes in their own offices and simply transmit the updated files back to Johnson Controls via the Internet.

This is an example of a small reengineering effort, but it is significant, nonetheless. It shows that Johnson Controls is looking for new ways to accomplish business goals through the use of IT. What's more, the company didn't spend millions of dollars designing and implementing a totally new system. Instead, it took a common and inexpensive tool (the Internet) and began using it for practical business purposes.

Another way to reengineer a business process with technology is to implement a knowledge base — a database with vital customer information. Imagine how you could improve service if you didn't always have to ask the customer for his name, rank and serial number. For instance, my oil change service center has a knowledge base keyed off of customers' license plates. As I drive my car into the bay for service, the serviceman is keying in my license number. Before I get out of the car, he knows when my last oil change was, what kind of oil I prefer and whether I like water or washer fluid for my windshield. Does that create a happy customer and generate more business for him? You bet.

Reengineering opportunities abound. All it takes to get started is a little imagination and a willingness to bend or break the rules. Just remember that technology is the enabler for transforming your business.

♦ Musthaler is vice president of research at Currid & Co., a Houston-based technology consulting firm. She can be reached at (713) 789-5995.

by John R. Rymer

### Distributed objects, BPR make a winning pair

Users have made an important discovery about distributed object computing. They've realized the technology allows them to directly relate development of in-house networked applications to their corporate business strategies and thereby achieve their business goals.

This development was evident at the Patricia Seybold Technology Forum earlier this year, where a variety of users described how business process reengineering (BPR) is providing the missing link between advanced technology and business strategy. BPR is all about changing the way organizations operate to make them more efficient and effective. Typically, BPR begins with an analysis of a company's business process — for example, customer service. The next step is to reengineer the process to eliminate redundancies and wasted effort.

BPR planners describe both the existing and the new process by identifying the participants and the elements they work with, as well as how the participants and elements interact. Objects are a convenient way to think about the participants and elements; object messaging is a convenient way to describe the interactions.

BPR has the potential to increase distributed object computing's value. In fact, by marrying BPR and distributed objects, user organizations may be able to solve a puzzle that has existed since the first data processing systems debuted in the 1960s.

Traditionally, information systems departments have always been one step removed from the decision making that drives corporate strategy and tactics. IS is forever trying to synchronize the applications it is responsible for with constantly changing business strategies.

The BPR-object combination closes the gap between system development and business strategy. At the Patricia Seybold Technology Forum, companies as diverse as General Motors Corp., GTE Corp. and Citibank, N.A. revealed that BPR is the basis for sweeping reform of their business practices.

GM, for example, is using BPR to completely revamp its tool-and-die operations. By laying out the steps in the current process, GM hopes to find bottlenecks and redundancies, and get rid of them by introducing new processes. In doing so, GM hopes to slash the time it takes to make a die by half and reduce overall costs by \$500 million annually.

While beneficial, this approach does not have a close link to information technology. Information systems are built after the new process has been designed. Distributed objects provided the missing line.

GM's BPR project really picked up momentum when the company brought in consultants experienced in object design and construction. These consultants developed software that used objects to define the concepts, tasks and operations defined by GM's BPR group. The software prototype enabled the BPR group to test its ideas for new and revised die-making processes almost immediately. The result was valuable refinements to business process planning.

This marriage of BPR and distributed object computing works because objects offer such a powerful language in which to describe information systems. BPR specialists understand objects in the application prototypes because they match process designs. Moreover, object systems are inherently flexible. The prototypes are easy to change to test feedback and new ideas. The prototypes also allow GM to test the behavior of software running on networks. Die-making plants are, by nature, networked facilities, and applications to automate them must be distributed.

The meaning of GM's experience is clear: BPR plus distributed object computing offers new opportunities to achieve strategic advantage by using information technology. BPR and distributed object computing are a breakthrough combination.

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Letters have moved this week to page 56.



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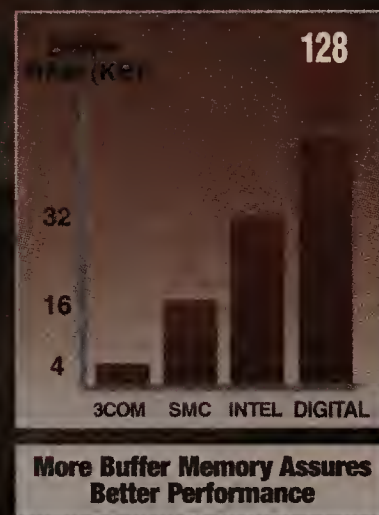
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# Wireless Networks

## Separating fact...

**A**T&T and a host of other vendors are promising that "anytime, anywhere" networking is just around the corner. And well it may be. Getting there, though, looks like it's going to be a tedious job for companies seeking a critical business edge through wireless networks. While traditional telephony carriers and a pool of brash new upstarts are busy laying the foundations for wireless data services, major systems vendors are slowly beginning to address the emerging market.

The upshot is, while many carriers today are already offering wireless data services or are on the threshold of doing so, you may find that they are providing the equivalent of a major new highway system that your computing vehicles can't access.

What vendors really need to do, and soon, is begin mapping out plans for how their network operating system and their remote access server products will support mobile professionals accessing corporate data. Likewise, major applications suppliers such as Lotus Development Corp. also need to begin articulating a strategy for mobile professionals.

In the meantime, you might want to begin evaluating what's real today and what is just around the corner. Our first story, "Prospects are golden for wireless data services," delves into the buying realities of wireless data services that are available today. Unlike commodity-level wireline services, packet radio and other wireless services are a complex buy, involving a myriad of factors.

We also elected to examine the evolution of personal digital assistants (PDA) and how they might be used with intelligent software agents to get at data in corporate databanks and other repositories worldwide.

We wrap up with a look at personal communications services (PCS). *Network World's* last Technology Planning survey revealed that users were bypassing available wireless services, electing instead to wait for PCS. And now there's a battleground being fought over who controls the available bandwidth to provide a range of different services. Choosing the right type of PCS is going to be a major decision.

Anywhere, anytime computing might make good advertising copy, but getting there is going to be an adventure — and one worth being prepared for.



## ...from fiction

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# Prospects are golden for WIRELESS DATA SERVICES

By JAMES KOBIELUS

**A**nyone who's been watching the emergence of wireless data services can attest that vendors are storming the market with as much zeal as the gold prospectors who descended on California in the 1800s.

And the attitude among these new revenue prospectors is pretty much the same: There's gold in them thar' airwaves.

The wireless data service industry is evolving at a furious pace, and with it comes promises for new services and grandiose plans for networks that are quite literally out of this world.

For anyone interested in testing the waters with these relatively new services, the trick is to focus on what's available today. Companies should be careful not to pin their wireless networking strategies on futuristic services — such as the Teledesic Corp. low-earth orbit satellite telephony championed by the likes of Bill Gates and Craig McCaw.

Network managers may be tempted to wait for the skies to open up and for vendors to deliver all the long-promised new wireless services, but such a tactic would not be a strategic move. Companies that plan to use mobile data services should already be evaluating or piloting at least one currently available wireless service.

The potential business rewards of fitting wireless technology into a company's enterprise network strategy far outweigh the risk of allowing a competitor to get the jump on you and deploy a wireless sales or customer service support application that gives it a competitive edge.

As if that isn't enough, chances are that mobile users — sick of searching for phone jacks for their laptop modems every time they want to read electronic mail — are probably already banging on your door for wireless access to corporate data. If you hear the knocking or just

want to experiment with the technology, there are a fistful of solutions to support wireless, two-way data for E-mail, database access and file transfer.

Many new segments of the wireless data market will burst forth within the next two years, including Cellular Digital Packet Data (CDPD), narrowband and broadband personal communications



services (PCS), enhanced specialized mobile radio (ESMR), enhanced paging and spread spectrum. The Federal Communications Commission's just-completed narrowband PCS spectrum auction and upcoming broadband PCS auction will launch dozens of new U.S. wireless service providers.

All this competition will produce a

bumper crop of sophisticated wireless services and lightweight, user-friendly mobile terminals at declining prices. The U.S. wireless data service market will grow at an annual rate of 80% through 1998 and will reach \$2.7 billion in service revenues and 5.6 million wireless data devices by that year, according to a recent study by market research firm BIS Strategic Decisions in Norwell, Mass. The study predicts that CDPD and narrowband/broadband PCS will be the fastest growing wireless data service segments, with aggregate growth rates of 221% and 208%, respectively, through 1998.

Users today can plug cellular modems into their laptops and dial in to their corporate networks over standard, analog, circuit-switched cellular voice channels. These specialized modems connect to the cellular channels either through a wired connection to a cellular telephone or through integrated cellular transceivers.

Another option allows users to access corporate data resources via an existing regional, analog specialized mobile radio (SMR) network by using a radio modem or special terminal equipped with an 800-MHz or 900-MHz SMR interface. Generally, this approach requires implementing a private, two-way, packet-oriented wireless network over leased SMR channels.

Users can also subscribe to a public packet radio data service (such as ARDIS Co.'s ARDISNet or RAM Mobile Data's Mobitex) and dial up their office through a radio modem compatible with the provider's air link protocol. One advantage packet radio networks have over circuit-switched cellular and SMR is subscribers' ability to maintain transparent, continuous connectivity while roaming throughout the U.S.

Some companies may lean to becoming early adopters of CDPD service, which is being deployed nationally by cellular telephone companies as an over-

**The options are many and multiplying, and the myriad of buying factors make wireless data services a complicated purchase.**



lay to their existing networks. CDPD is a standards-based, connectionless, packet data service that utilizes spare capacity on cellular voice channels and promises faster data rates (19.2K bit/sec) and greater security than existing wireless networks.

If those options don't appeal to your needs, perhaps your company needs a taste of tomorrow's higher speed wireless data services by exploring Metricom, Inc.'s 77K bit/sec Ricochet offering, which operates over the unlicensed 902- to 928-MHz spectrum band and utilizes a mesh network of low-powered, microcellular radios located on street lights, utility poles, and buildings. Ricochet metropolitan-area mobile service is currently available in the San Francisco Bay area and will be rolled out by year's end in Seattle, Boston, and Houston. The service requires Metricom's low-powered, spread-spectrum modem technology, which the company has licensed to other manufacturers in hopes of building a mass market, according to Robert Dilworth, chief executive officer and president of the Los Gatos, Calif., firm.

For this article, we elected to focus on currently available two-way, wireless data services. We did not consider national wireless data services such as Destineer Corp.'s narrowband PCS service, Nextel Communications, Inc.'s and Geotek Communications, Inc.'s ESMR two-way data services, and Pinpoint Communications, Inc.'s locator/messaging service. These offerings are not expected to be available until mid- to late 1995. We also opted to bypass any discussion of one-way (paging), non-portable (very small aperture terminals) and vehicular (air-to-ground, maritime, radiolocation) services because they represent narrow niches that are likely to be absorbed into tomorrow's high-speed, two-way, globe-spanning, multiservice mobile networks.

Choosing the right wireless two-way data service for your needs is a process of elimination, based on such criteria as availability, coverage, roaming, transmission speed, network capacity, air link confidentiality, interoperability, available hardware and software, and price.

## WITHIN RANGE

If your users roam primarily within a single city or region, the best option may be traditional circuit-switched cellular service, due to its widespread availability. Approximately 80% of mobile data users want solutions for a single metropolitan area, according to Larry Sanders, vice president of marketing at Racotek, Inc., a Minneapolis-based firm that helps large companies interface corporate data networks to public wireless services.

Packet radio services are today's preferred wireless data solution for national roaming, thanks to ARDIS' and RAM Mobile's support for transparent call handoff through an extensive network of cell sites. That's why large companies have flocked to ARDIS and RAM Mobile to support sales agents, maintenance technicians, truckers and other personnel who travel extensively. ARDIS has the most extensive national network, reaching 10,700 U.S. cities and towns, compared to the 7,500 municipalities served by RAM Mobile.

The chief limitation of circuit-switched cellular services with regard to roaming is their traditional regional orientation. Cellular subscribers who roam between two or more large cities typically need accounts with multiple service providers and must provide business associates with special access numbers for reaching them on

other cellular systems. Some cellular carriers, such as Bell Atlantic Corp., have implemented automatic local registration and call forwarding for roaming subscribers. Unfortunately, these capabilities are not widely available in the cellular industry and depend on bilateral agreements between service providers.

SMR — most often associated with police and taxi dispatch — is a regional service with less roaming support than cellular. It is best suited to mobile data applications where users rarely stray beyond the SMR cell site's typical 30- to 150-mile maximum coverage radius.

Some large companies — most notably, Federal Express Corp. and United Parcel Service of America, Inc. — have built dedicated, national, packet radio networks that operate on SMR bands and are based on special FCC frequency assignments. Interestingly, the ARDIS packet radio service has its roots in SMR data technology, having begun life in the mid-1980s as an IBM internal field-support mobile network. However, unlike standard SMR data networks, ARDIS signals can penetrate buildings.

CDPD, the new kid on the wireless block, may soon match packet radio networks' national coverage and roaming support. Most cellular companies will begin providing CDPD services in the coming year. McCaw Cellular Communications, Inc., Bell Atlantic and Ameritech Cellular Services are now providing commercial CDPD service in some of their largest metropolitan cellular markets and have announced plans to make it available to most existing customers within a year.

"By the end of this year, McCaw will roll out CDPD to 800 cell sites nationwide," says Chuck Berman, director of market development for McCaw's wireless data division. He says McCaw's anticipated year-end coverage will compare favorably to ARDIS' or RAM Mobile's current networks.

McCaw can expand its CDPD coverage as fast as demand develops since an existing cell site can be retrofitted to the service in just a few hours by two on-site technicians, Berman says.

Transparent data roaming within and between CDPD carriers' networks will be widely available by this time next year, according to Chuck Parrish, general manager for wireless data at GTE Mobilnet, Inc. and a member of the CDPD Forum, an industry association of service providers, hardware/software manufacturers, systems integrators and value-added resellers. The association is currently coordinating tests of intercity roaming interoperability among all current CDPD service providers, infrastructure vendors and mobile terminal vendors, says Parrish. The capability will be demonstrated publicly by the end of this year, he adds.

## SPEED SELLS

If you're thinking about running multimedia and video applications over today's wireless data services, think again. None of the current services — or even any on the drawing board — support the multimegabit data rates required for those bit-hungry applications. For the foreseeable future, mobile users will have to access multimedia applications through off-line laptop CD-ROMs, through occasional wired connections to high-speed terrestrial networks (Asynchronous Transfer Mode, Switched Multimegabit Data Services or ISDN), or a combination of both strategies.

What you will have to settle for are raw wireless data rates between 4.8K and 19.2K bit/sec, which is a speed range consistent with run-of-the-mill terrestrial modems. Circuit-switched cellular and SMR data modems typically attain rates between 4.8K and 9.6K bit/sec, depending on the quality of the connection.

Continued on page 46

# A glossary for the wireless world

**AUTOMATIC VEHICLE LOCATION** — A wireless service that allows a central dispatcher to track the precise latitude and longitude of a moving or stationary vehicle.

**BROADBAND PCS** — A new generation of connection-oriented and connectionless digital wireless communications services that will utilize channels in the 1.8- to 2.2-GHz band to be auctioned by the FCC; wider radio channels will support faster services than narrowband PCS.

**CELLULAR DIGITAL PACKET DATA (CDPD)** — A digital, connectionless, two-way, link-encrypted wireless data communications service that operates at 19.2K bit/sec per channel and utilizes available capacity (such as idle times between voice calls or separate channels) on cellular telephone systems.

**CIRCUIT-SWITCHED CELLULAR** — Connection-oriented, two-way, wireless data connectivity on cellular telephone systems.

**ENHANCED PAGING** — A paging service that supports extended text messages, voice mail notification, fax notification, automatic voice dialing of cellular calling-party numbers and/or other advanced message management services.

**ENHANCED SMR** — A new generation of circuit- and packet-oriented digital wireless communications services that will utilize channels in the 800- to 900-MHz SMR bands.

**NARROWBAND PCS** — A new generation of connection-oriented and connectionless digital wireless communications services that will utilize channels in the 800- to 900-MHz band already auctioned by the FCC; narrower radio channels will support lower speed services than broadband PCS.

**PACKET RADIO** — Digital, connectionless, two-way, wireless data communications services that utilize channels in the 800- to 900-MHz SMR band, operate at between 4.8K and 19.2K bit/sec per channel, and support transparent subscriber roaming and call handoff throughout a national coverage area.

**PERSONAL COMMUNICATIONS SERVICES (PCS)** — A new generation of digital, two-way, microcellular, low-powered wireless services in the 800- to 900-MHz and 1.8- to 2.2-GHz bands that will support personal telephone numbers, seamless roaming, and flexible call handling and service integration; will support a wide range of services, including telephone calling, voice messaging, E-mail, file transfer, remote logon, paging, broadcast and fax.

**SPECIALIZED MOBILE RADIO (SMR)** — Analog, half-duplex, high-powered, vehicular wireless services in the 800- to 900-MHz band; traditionally used for voice dispatch, fleet management and public safety applications.

**SPREAD SPECTRUM** — Highly secure transmission technology that scatters data packets across randomly selected channels in the unlicensed 902- to 928-MHz band.



**The ARDIS packet radio network serves 10,700 U.S. cities, as compared to 7,500 municipalities served by RAM Mobile Data.**





## Wireless Networks

## Continued from page 45

Packet radio services range in speed from 4.8K bit/sec (ARDIS nationwide) to 8K bit/sec (RAM Mobile nationwide) and 19.2K bit/sec (ARDIS in selected cities).

CDPD promises a consistent 19.2K bit/sec speed nationwide across all service providers, while start-up Metricom — with its low-power spread-spectrum packet service — boasts raw data rates as high as 77K bit/sec in selected metropolitan areas. Metricom is a forerunner of tomorrow's higher speed wireless data networks, according to Ira Brodsky, president of Datacomm Research Co. in Wilmette, Ill.

Users should expect to see broadband PCS data rates as high as 500K bit/sec by early in the next decade, says Gerry Purdy, president of The Pacific Group for Mobile Computing and Communications, Inc., a consulting firm in Santa Clara, Calif.

Of course, whatever the published wireless data rate, you should always expect actual application throughput to be considerably less, due to protocol overhead, long packet latencies, and multiaccess channel contention. "All wireless nets have high protocol overhead, which can cause application performance to be 40% to 50% less than published data rates, Brodsky says.

## NETWORK CAPACITY

Peak-hour channel contention (such as when many users clamor for a limited amount of radio spectrum) is a potentially serious problem on both circuit- and packet-switched wireless networks, especially as these services become more popular. Network managers should think twice about committing their users to wireless service providers that consistently underbuild their nets.

Not surprisingly, most cellular and packet radio service providers are taking a proactive approach to ensure adequate data communications capacity on their systems. Most service providers are utilizing the same general approach to capacity management: dividing service areas into ever-smaller microcells, moving cell sites closer together and reusing the same frequencies more intensively in those cells.

Packet-oriented services such as those by ARDIS and RAM Mobile, as well as CDPD, inherently use radio spectrum more efficiently than circuit-switched cellular networks because the former interleave traffic from many users over common frequencies.

However, packet radio and CDPD proponents each have their own twist on network capacity management, and each will try to put the best spin on its own approach.

ARDIS and RAM Mobile boast that their nets have plenty of capacity because they are dedicated to data communications, pointing out that start-up CDPD services — which will piggyback data onto existing cellular networks — forces data traffic to hop around for bandwidth not claimed by higher priority voice traffic.

CDPD providers claim there is ample bandwidth on today's Advanced Mobile Phone System (AMPS) analog cellular nets to support low-speed, bursty data applications. They say that as CDPD traffic grows, they can continue to subdivide calling cells while dedicating some AMPS channels to data traffic.

They also note that conversion from AMPS to digital cellular technologies will increase cellular net capacities by a factor of three to 10, which will, in theory, free up channels for data traffic.

There is already evidence of the digital conversion. The surest signs are to look for carriers making the move to CDMA or Time Division Multiple Access technologies, in addition to AMPS. This

cosupport for the older AMPS and newer technologies will enable a caller to signal the network that it needs a connection, after which the carrier will determine — based on the customer's equipment — whether to supply an analog or digital channel.

## AIR LINK CONFIDENTIALITY

Eavesdropping is a perennial concern with wireless communications. Mobile data service providers are quick to highlight their approaches for securing the subscriber's air link — the point-to-point connection between a mobile terminal and the provider's cell site — against unauthorized reception or listening.

Without strong confidentiality safeguards, wireless services would not be appropriate for many corporate applications, especially those that involve credit card authorization, privacy-sensitive data and corporate intellectual property.

Spread-spectrum-based public services — of which Metricom's is the first commercial example — are especially secure, due to their ability to scatter data segments rapidly over a random selection of frequencies. Spread-spectrum signals are virtually indistinguishable from background noise to a potential eavesdropper.

ARDIS and RAM Mobile provide a level of air link confidentiality that is inherent in packet technology. They break down a user's information into smaller segments that are interleaved with many other people's traffic over common channels. It would be as difficult for eavesdroppers to tap into any one packet radio session as it would be to piece together a 25-page report from a dumpster full of shredded papers.

CDPD providers offer the data security intrinsic to packet data services, plus dynamic frequency hopping and genuine point-to-point air link encryption. CDPD-compatible modems automatically encrypt all data sent to the carrier's cell site, while carriers encrypt all communications with subscriber terminals.

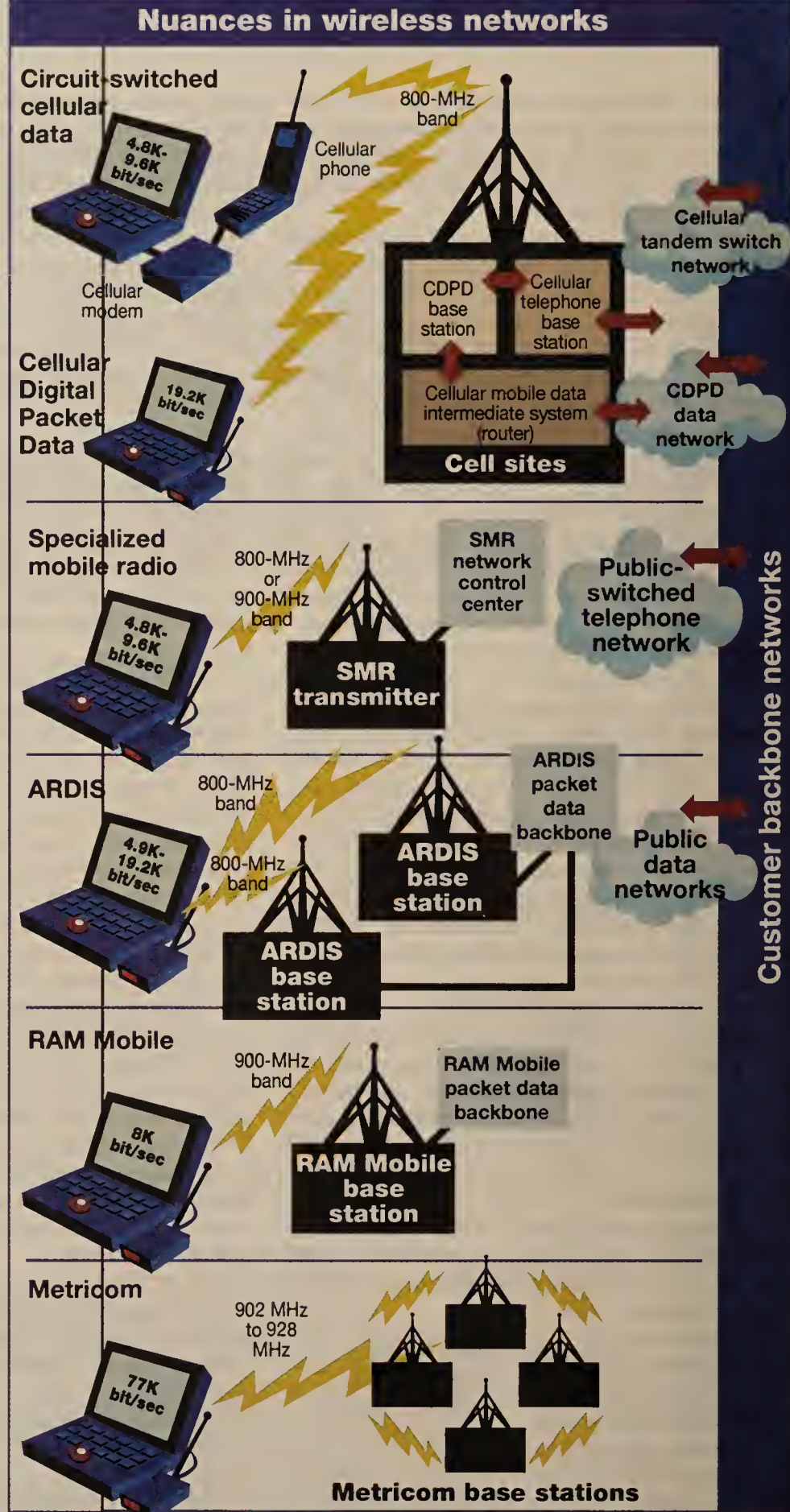
CDPD modems support bilateral authentication with cell sites, which reduces airwave pirates' ability to pass their terminals off as belonging to authorized CDPD subscribers.

The most effective way to ensure confidentiality on circuit-switched cellular connections is bilateral end-to-end encryption between mobile users and the parties with whom they are communicating. A serious disadvantage of end-to-end encryption is the logistical difficulty and expense of distributing keying material in advance to all parties that may choose to exchange data.

Users considering data encryption over circuit-switched cellular should look into the more viable approach of exchanging per-session secret keys via public-key encryption.

Don Rees, vice president for client operations at Baltimore-based First National Bank of Maryland, says, "[I] would be most comfortable front-ending my own encryption on mobile terminals," rather than relying on the wireless carriers' link encryption.

Rees is evaluating wireless data services for security-sensitive financial applications,



SOURCE: JAMES KOBIELUS, ALEXANDRIA, VA.

## Up-and-comers

Planned 2-way wireless services.

Company Phone	Service	Service type	Data rate	Protocol	Frequency range	Coverage
Destineer Corp. (601) 944-1300	Destineer	2-way paging	24K bit/sec	Narrowband PCS	940 MHz	Top 300 U.S. markets in second half of 1995
Nextel Communications, Inc. (201) 438-1400	Unnamed	Digital cellular voice; 1-way paging and text messaging; 2-way circuit-switched data; 2-way high-speed packet data service	4.2K bit/sec for 1 way paging/messaging; 4.8K bit/sec for 2-way circuit-switched data	Proprietary	800 MHz	1-way paging and text messaging now available in Los Angeles, San Francisco and Sacramento, Calif., with Chicago and New York by year end; 2-way circuit-switched data in 1995; 2-way packet-switched service in 1996
Geotek Communications, Inc. (201) 930-9305	GeoNet	Voice dispatch, circuit data, packet data and automatic vehicle location	Unannounced	Spread spectrum - Frequency Hopping Multiple Access	900 MHz	New York and Philadelphia by end of 1995; 33 other cities in 1996



## Wireless Networks

## Wireless data services

Provider	Service	Data rate (K bit/sec)	Protocols (data rate in K bit/sec)	Frequency range (MHz)	Coverage (No. of base stations)	Pricing		
						Onetime fee	Usage fees	Package plans
Packet radio services								
ARDIS Co. (708) 913-1215	ARDIS	4.8 (1)	Proprietary: 4.8 RD-LAP: 19.2	800	1,250+ covering 400 metro areas nationwide	ARDIS: \$1,445/user	8.5 to 17.6 cents per packet	(2)
	PersonalMessaging	4.8	Proprietary: 4.8 RD-LAP: 19.2	800	1,250+ covering 400 metro areas nationwide			\$69/month for 200 messages
RAM Mobile Data (908) 602-5500	Mobitex	8	Proprietary: 8	896-901	870 covering top 216 metro areas	\$50 registration fee, \$25 monthly subscription charge	4 to 12.5 cents per packet, depending on packet size	Plan 1 - \$25/month for first 100K bytes; 25 cents for each additional kilobyte  Plan 2 - \$75/month for 400K bytes; 20 cents for each additional kilobyte  Plan 3 - \$135/month for unlimited usage
Cellular Digital Packet Data services								
Airtouch Cellular Data Group (510) 988-4438	Presently unnamed	19.2	CDPD Airlink Interface	800	Houston, San Francisco (3)	Unavailable		
Ameritech Cellular Services (800) 662-4531	Wireless Packet Data Service	19.2	CDPD Airlink Interface	800	Chicago (4)	Custom	Custom	Custom
Bell Atlantic Mobile Systems, Inc. (800) 255-2355	Airbridge Packet	19.2	CDPD Airlink Interface	800	Baltimore, Pittsburgh, Washington, D.C. (5)	\$50 fee for each network equipment identifier plus \$15-\$120 for monthly minimum charges	.0017 to .0058 cents/packet peak period; 17 to 58 cents/kilo- byte packet during peak period	50% off-peak packet discounts
Spread-spectrum data service								
Metrcom, Inc. (408) 399-8200	Ricochet Micro Cellular Data Network	77	Proprietary	902-928	San Francisco Bay area cities (6)	\$95/user		\$29.95/month (77K bit/sec) \$19.95/month (19.2K bit/sec) \$9.95/month (9.6K bit/sec) \$2.95/month (2.4K bit/sec) \$15/month for Internet access

## Footnotes:

- (1) ARDIS also available at 19.2K bit/sec in Los Angeles, New York and Washington, D.C.  
 (2) Volume discounts available.  
 (3) Availability scheduled for 4Q.  
 (4) Service planned for St. Louis and Detroit in 4Q; other Midwestern metro areas in next 12-18 months.

(5) Availability planned for all Bell Atlantic areas in 4Q.

(6) Service scheduled for Boston, Houston and Seattle in 4Q 30 other cities by end of 1996.

RD-LAP = Radio Data-Link Access Protocol

such as automated teller machines capable of rapid deployment to public events where terrestrial circuits cannot be quickly or cost-effectively implemented.

## INTEROPERABILITY

Wireless data services are useless if they don't support some degree of interoperability with established, nonmobile corporate networks, hosts, servers, users and applications. Ideally, it should be possible to unplug a laptop with all its client software from the LAN, bring it on the road and enjoy uninterrupted — albeit occasionally slower — access to all corporate applications.

If you want mobile clients to interoperate with back-end corporate applications, you'll need to do two basic things.

First, establish the appropriate terrestrial connections between your corporate network and the wireless service provider's land-line gateway system or switching center. ARDIS and RAM Mobile — old hands at this sort of thing — support back-end connections through wireless modems, dial-up asynchronous terrestrial circuits, X.25 leased lines or X.25 packet data network connections. CDPD carriers are touting their ability to support all of those

back-end links, as well as frame relay and SMDS.

Meticom will provide back-end access to its spread-spectrum metropolitan-area network through asynchronous modems or Internet links.

Second, you will have to run the appropriate protocols (TCP/IP, IPX/SPX, SNA or LU 6.2) over end-to-end connections between wireless terminals and corporate backbone nets. This can get a bit tricky because even if the wireless service provider ostensibly supports these protocols, you probably won't be able to run them unmodified over wireless links. You'll almost certainly have to perform thorough interoperability tests before deploying existing corporate applications on mobile terminals.

If you're using circuit-switched cellular modems, you'll have to make sure that mobile clients and back-end corporate servers either have compatible modems or access to a modem pool that converts between wireless modem link protocols — such as Microcom, Inc.'s Microcom Network Protocol-10

(MNP-10) or AT&T Paradyne's Enhanced Throughput Cellular (ETC) — and those associated with wire-line modems. Not surprisingly, Bell Atlantic, Ameritech Cellular, Southwestern Bell Mobile System and other cellular carriers are providing protocol-conversion modem-pool services to their circuit-switched data customers.

Whether you are using a circuit- or packet-switched wireless data service, you'll have to determine whether your existing client protocol stacks work with the modems and device drivers required by the service provider. There are no real standards for wireless packet data link-level protocols:

ARDIS, RAM Mobile, the CDPD community and Meticom have their own special air link protocols, as will future wireless data technologies (narrowband PCS, broadband PCS and ESMR).

One important consideration in evaluating wireless data modems is their ability to work with your existing communications applications — for example, through support for the

Hayes Microcomputer Products, Inc. modem AT command set.

CDPD technology will "make it easy for one modem to support both wireless and wire-line E-mail access" through menu-driven communications software options, says Lee Nolan, senior telecommunications engineer at The Travelers Insurance Co. in Hartford, Conn.

Nolan evaluated but decided not to implement ARDIS or RAM Mobile's services because they would require separate modems and communications software in each portable computer in order to support wireless and wire-line network access. Wire-line modems might be required when wireless service is unavailable, unreliable or too slow.

In moving to wireless data access, you'll probably have to make some client and server application changes — hopefully, not too many — to compensate for the out-of-range connection losses, longer packet delays and lower transmission speeds associated with radio links. CDPD providers claim that you'll be able to run your existing TCP/IP applications with minimal modification over their networks, which could give CDPD a performance advantage over packet radio nets.

"The CDPD specification is

based on industry-standard TCP/IP protocols," says McCaw's Berman. "CDPD networks can route native TCP/IP packets. For RAM Mobile and ARDIS to route TCP/IP traffic on their networks, they need back-end gateways that convert or encapsulate TCP/IP packets into a proprietary protocol, which can result in a significant performance degradation."

You may want to consider reengineering client/server applications to minimize the amount of data sent over the air, since most wireless nets charge on a per-packet or per-kilobyte basis.

One tip, according to Rob Euler, ARDIS' vice president of business development, is to avoid transmitting unnecessary screen refreshes over the wireless link. "What's required is [genuine] client/server application development," Euler says.

## THE INTEGRATION FACTOR

To support customers' attempts to wireless-enable their applications, packet radio and CDPD service providers are building alliances with wireless consultants, systems integrators and independent software vendors.

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## Wireless Networks

## Continued from page 47

Until the wireless data market matures, most mobile applications will be custom-built. Consequently, you should evaluate wireless carriers by the level of systems integration support that they or their business partners can provide. "Prepare for a big software development effort when you implement wireless data services," says Datacomm Research's Brodsky.

If you're serious about including wireless services in your corporate data networking strategy, one integrator worth watching is Racotek.

The company's RacoNet gateway allows customers to extend their corporate information systems to mobile workers over public wireless infrastructures without changing their existing applications.

ARDIS and RAM Mobile have a couple of years' head start on all the other industry segments in this regard. A growing number of hardware manufacturers are selling specialized data terminals, radio modems, personal digital assistants and other portable devices that support these providers' protocols and services. A great many LAN-based E-mail packages have been ARDIS- and RAM Mobile-enabled, including Lotus Development Corp.'s cc:Mail and Microsoft's Microsoft Mail.

And a niche market has developed for value-added, third-party wireless E-mail services — including RadioMail Corp.'s RadioMail and Wynd Communications Corp.'s WyndMail — that run over ARDIS and RAM Mobile's networks.

nals and modems is sure to stimulate the horizontal and consumer markets for wireless data services.

## HEAVY PRICE TO PAY

Calculating the cost of wireless data services can be a complex proposition. Many applications are custom designed and serve particular vertical markets, such as fleet management and technical field support. As a result, service providers often prefer to quote custom prices based on a host of factors, including activation charges, monthly charges, usage charges (per character, kilobyte, packet, message or transaction), peak-period charges, back-end connectivity charges and volume discounts.

When comparing prices of different wireless data services, one useful approach is to estimate the recurring costs of one or more target applications, such as E-mail. We created our own network model and asked vendors to submit price quotes for what we believe are the typical needs of a wireless E-mail user — sending and receiving 200 messages per month (see graphic).

When pricing out wireless services, don't forget to include the potentially significant costs of acquiring user terminals and developing or modifying application and system software to support wireless connections. If you're contemplating a vertical market, mission-critical application, you may also want to factor in the costs of hiring consultants to assist in business process reengineering, traffic analysis, network design and user training.

## FOCUS ON THE PRESENT

In evaluating commercial wireless data services, be careful not to confuse services that are available today with those that will arrive a year or two — or three or more — from now. Wireless service providers often seem to jump the gun and describe future services as if they were on our virtual doorstep.

Also be careful not to commit your company entirely to one wireless data technology. There is no telling how the market will shake out once all the new services are deployed and the current gold rush fever has cooled. The proliferation of competing wireless services will not slow down until around the year 2000, predicts BIS Strategic Decisions, by which time demand will begin to plateau, dominant standards will emerge and less successful technologies will be abandoned or relegated to marginal niches.

Continuous, wireless, wide-area access to the corporate backbone network is part of every organization's future. Forward-looking companies should start now to factor wireless into their enterprise networking strategies.

♦ Kobielus, a contributing editor to *Network World*, is a senior telecommunications analyst with DynCorp, a Reston, Va., systems integration and professional services firm. He can be reached at (703) 461-2367 or via the Internet at kobielj@usva8.dyncorp.com.

## Comparative service pricing

Based on average per-user monthly use of 200 E-mail messages sent over 2-way wireless data services (excluding onetime installations and setup charges).

Company	Rate
<b>Packet radio</b>	
ARDIS Co.	\$69 for the first 200 messages; additional messages cost 29 cents a piece.
RAM Mobile Data	\$50, based on rates that cover \$25 per month for the first 100K bytes transmitted and 25 cents for each additional kilobyte, assuming 1K byte per message.
<b>CDPD services</b>	
McCaw Cellular Communications, Inc.	\$40 to \$45; charges based on flat-fee, unlimited usage.
Bell Atlantic	\$36, based on assumption of 18 cents per message; monthly minimum charges range from \$15 to \$120; per-packet peak period charges from .17 to .58 cents; per-kilobyte peak period charges from 17 to 58 cents; 50% off-peak period discounts offered.
<b>Spread spectrum</b>	
Metricom, Inc.	\$7.95 to \$44.95, depending upon link speed and type of external net access. Monthly rates per service speed: \$29.95 for 77K bit/sec \$19.95 for 19.2K bit/sec \$9.95 for 9.6K bit/sec \$2.95 for 2.4K bit/sec \$15 for access to the Internet \$5 for access to public switched network

SOURCE: DYNACORP, RESTON, VA.

RacoNet now works only with SMR wireless data nets. However, upgrades that will interoperate with ARDIS' and RAM Mobile's nets, as well as CDPD and circuit-switched cellular will be ready for customer trials in the first quarter of 1995, according to Pat Milan, Racotek's communications director.

Remote procedure call technology will be used to support transparent interfaces between the RacoNet gateway and such corporate computing environments as MS-DOS, Microsoft Corp. Windows, OS/2 and Unix.

Products such as RacoNet could be the glue that binds legacy corporate networks to the new wireless world. "Once you write your application software to our environment, you will have access to all wireless environments," Milan says. The ultimate proving ground for wireless service providers is their success in cultivating a market for compatible mobile data terminals, shrink-wrapped applications and value-added network services.

There are only a handful of CDPD terminal hardware, software and value-added service offerings on the market today. But CDPD service providers are building impressive support from such development partners as America Online, Apple Computer, Inc., Compaq Computer Corp., General Magic, Inc., IBM, Lotus Development Corp., Microsoft, Motorola, Inc., Sharp Corp. and Sun Microsystems, Inc.

Yet another challenge facing all segments of the wireless data industry is reducing the size, weight and power requirements of modems and other terminal equipment. "Today, in all cases, radio modems are large and not convenient for mobile executives," says The Pacific Group for Mobile Computing's Purdy.

In 1995, users can expect to see notebook computer-ready, miniature PCMCIA versions of ARDIS, RAM Mobile, and CDPD cellular modems hit the market.

Further miniaturization of termi-

## Wireless strategies

## What to expect from:

## PACKET RADIO PROVIDERS

- Stress their increasingly familiar brand names.
- Tout national coverage areas, seamless roaming and network reliability.
- Fill in remaining coverage gaps.
- Increase data rates.
- Provide streamlined national account support.
- Develop alliances with value-added terminal hardware, software and services providers serving vertical and horizontal markets.

## CDPD PROVIDERS

- Market value-added data services to shore up declining revenues per cellular subscriber.
- Leverage cellular brand names and installed bases.
- Tout existing infrastructure, full-service wireless offerings (circuit-switched cellular, CDPD and paging), faster data rates, open standards compliance, link encryption and land-line network integration.
- Build out and interconnect their national and regional networks.
- Develop alliances with value-added terminal hardware, software and services providers serving vertical and horizontal markets.

## SPREAD-SPECTRUM PROVIDERS

- Build out their metropolitan networks.
- Develop vertical solutions.
- Tout faster data rates.
- Attempt to build market for terminal hardware and software to support their air link protocols.

## NARROWBAND PCS PROVIDERS

- Build out national networks.
- Tout potential for seamless national coverage, streamlined national account support and faster data rates.
- Attempt to build a market for terminal hardware and software to support their air link protocols.

## ENHANCED SMR PROVIDERS

- Build out national networks.
- Tout potential for seamless national coverage, streamlined national account support and faster data rates.
- Attempt to build a market for terminal hardware and software to support their air link protocols.



# PDA's

## *will usher in the next net revolution*

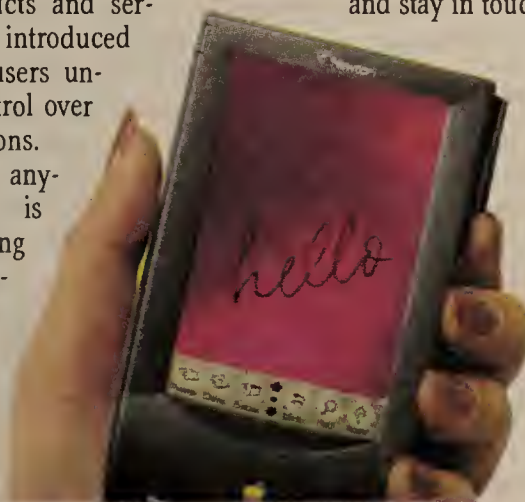
**New devices will combine with emerging wireless services to let information agents act on behalf of their users.**

**By IRA BRODSKY**

**J**ust as desktop computers freed users from the tyranny of the mainframe, personal communications is about to liberate them from network tethers.

There is more, however, to personal communications than becoming unplugged. Personal communications will define new standards for timely access to people and information. Contrary to fears that wireless communications will leave users nowhere to hide, new products and services are being introduced that will grant users unprecedented control over telecommunications. Communicating anytime, anywhere is nice, but offloading routine communication tasks to pocket-size information appliances will be nirvana.

Silicon and gallium arsenide chips are doing for telecommunications what microprocessors did for microcomputing. Personal computers are falling off desktops and into users' hands or pockets, radios are going digital, and the first generation of personal digital assistants (PDA) — personal communicators — are emerging. These devices will enjoy the same spectacular rise in performance, and precipitous decline in price, that put tens of millions of personal computers into everyday use.



Granted, the first PDAs and personal communicators have not received rave reviews. But let's not forget that most MIS managers scoffed at early microcomputers. The applications for wireless information appliances are compelling. Sales organizations can employ them to prepare up-to-the-minute price and delivery quotes, zap orders directly from field to factory, and check order status. Mobile professionals can use them to share appointment calendars, access databases, and stay in touch with their peers (who may also be traveling).

As firms demand longer hours and more travel from information workers, personal communicators will become indispensable for staying in touch with the boss, colleagues and family.

To succeed, wireless data requires new types of portable electronic devices. Consider the PDA: The original vision was a pocket-size device that would act like a personal (human) assistant. When you needed data, you would pull out your PDA, flip it open and talk to the human-like image that appeared on the screen. Your assistant would not only keep track of your appointments, but would also know how to reach customers, suppliers and colleagues, where to find the information you need, and how to take memos, prepare spread sheets and compose letters.

**Continued on page 50**

## **Two-way paging set to explode**

One technology about to explode on the mobile networking scene is two-way paging. Not traditionally part of your domain?

Narrowband personal communications services licenses raked in more than \$600 million in recent auctions, and several new services are expected to come on-line in the next few years. These will include everything from acknowledgment paging (the ability to confirm that a mobile subscriber received a specific page) to voice paging (sending digitized voice clips to special voice pagers).

MTEL Corp., which owns the SkyTel nationwide paging service, has established a subsidiary called Destineer Corp. to provide a nationwide, two-way paging service over a single 24K bit/sec channel. Unlike conventional mobile data services, Destineer is positioned to upgrade existing one-way paging customers to two-way messaging. Not surprisingly, personal digital assistants and personal communicator vendors are anxious to tap this new service.

Paging Network, Inc. (PageNet) — the largest paging carrier in the U.S. — plans to launch a voice paging service. VoiceNow will provide mobile subscribers with what is, in effect, a pocket answering machine. The subscriber will receive messages, which can be replayed at will, in the caller's own voice. Leveraging two-way paging technology, VoiceNow locates the subscriber and then transmits the digitized voice message from the nearest base station.

Conventional paging systems broadcast messages over all of their base stations simultaneously — a technique called simulcasting. While this increases the likelihood that a message will be picked up by the intended recipient, it greatly reduces the network's overall capacity. Two-way transmission will make paging services more efficient, freeing up capacity for new services such as voice mail, electronic mail and even fax distribution.



## Wireless Networks

## Security looms as major wireless issue

Many network managers are reluctant to embrace wireless communications due to concerns about security. People tend to associate wireless communications with broadcasting; it is commonly believed that conversations or data sent over wireless networks cannot be kept private.

Once organizations begin to investigate wireless solutions, they realize privacy is only one of several security issues. Access fraud, personnel tracking, airborne computer viruses, intentional jamming, interference with sophisticated factory machinery and potential health hazards are some of the security issues that may crop up.

People have listened in on cellular telephone conversations using mail-order scanners. According to some estimates, as much as 15% of billable cellular airtime is lost to access fraud perpetrated by criminals who reprogram cellular phones to assume multiple identities — so-called tumbling clone phones. And although there have been no major incidents reported, users fear that wireless LANs could prove particularly vulnerable to airborne viruses.

Radio interference is an annoyance to consumers, but it can have serious consequences in other environments. There have been reports of portable radios interfering with sensitive patient monitoring devices in hospitals. According to *The Wall Street Journal*, there has been at least one case in which a patient underwent heart surgery unnecessarily after a two-way radio blanked out portions of his electrocardiogram trace, causing doctors to mistakenly conclude that he needed a pacemaker.

All of these problems can be avoided with new wireless technologies. Even without encryption, digital radio transmissions are unintelligible to mail-order scanners. With encryption, communications would become so secure that the U.S. government is worried that it will lose its ability to conduct wiretaps. Government agencies have been trying to pass legislation that would require telecommunications carriers to adopt a key-escrow encryption system for which the government would own the master key — the notorious Clipper Chip and associated SkipJack encryption algorithm.

The government also wants telecommunications carriers to design "back doors" for entrance by security agencies — with the proper authorization, of course.

There are also digital techniques for combating access fraud. Digital wireless networks will use challenge-response techniques to authenticate users. When the network issues a challenge — something it can do in the midst of a phone call — the subscriber device must respond with the unique solution within a very brief time. Only a device with the real user's smart card inserted will be able to issue the proper response. If it responds incorrectly, the smart card can be instantly remotely disabled.

In fact, digital wireless communications will be more secure than analog land-line communications. Wireless communications will increasingly use low-power transmitters, data encryption and techniques such as spread spectrum to make it not only difficult to eavesdrop, but also difficult to even detect that any communications is taking place. As wireless technology continues to evolve and network managers become more familiar with it, most security concerns will fade away.

**With encryption, communications would become so secure that the U.S. government is worried that it will lose its ability to conduct wiretaps.**

Continued from page 49

Apple Computer, Inc. first developed the vision and coined the term PDA. But because voice recognition technology was not yet sufficiently advanced, Apple decided to design its first entry around handwriting recognition. While the Newton MessagePad has received harsh criticism, it has enjoyed some success in vertical markets and continues to evolve.

Perhaps the best indication of Newton's impact has been the response of the once-sleepy data collection terminal industry. Companies such as Telxon in Akron, Ohio, Symbol Technologies in Bohemia, N.Y., and Norand in Cedar Rapids, Iowa, have begun to introduce PDAs of their own — ones that can be outfitted with bar code scanners and radio modems. While stock clerks continue to use specialized data collection terminals, PDAs are being targeted at retail salespersons and store managers. Salespersons can locate products and price out various product combinations for customers from anywhere within the store. Managers can monitor the success of special sales, check inventory or measure activity in specific departments.

While Apple positioned its PDA as a hand-held device for capturing, retrieving and organizing information, firms such as General Magic Corp., Sony Corp., Motorola, Inc., AT&T and IBM believe the new hand-held devices will succeed primarily as communication tools; personal communicators are evolving out of cellular phones, pagers and notebook computers.

Microsoft Corp. and its allies, on the other hand, think hand-held information appliances can succeed only as mobile companions to desktop PCs. Whatever you call them and however they are configured, there is a good chance these devices will spend considerable time in what some observers call the market chasm.

### INTO THE CHASM

The chasm is the gap between the initial flurry of sales to early adopters and the gradual ramp-up of sales as the product gains widespread acceptance. While early adopters may be enthralled by the vision behind PDAs, personal communicators and mobile companions, we may still be years away from products with the right features, look and feel, and price to attract Jane and Joe business user.

Lost in all of the criticism and skepticism is the fact that these products are delivering fundamentally new capabilities for end users. These include the ability to compose and send faxes from restaurants; to check airline schedules and make or change reservations from the back of a taxicab; and to communicate with colleagues sitting in a meeting without causing any disruption.

An example is BellSouth Corp.'s

Simon — a sort of electronic Swiss army knife that combines a cellular phone, fax machine, pager, personal organizer and pen-based sketchpad/notetaker in a pocket-size unit. Simon looks like a regular cellular phone, except its 'keypad' is displayed on an LCD screen. A predictive keyboard speeds pen-based text entry by presenting six large keys representing the most likely next characters. Simon was designed by IBM and is marketed by BellSouth Cellular Corp. of Atlanta at a suggested retail price of \$899. With Simon, users can send and receive faxes and electronic mail, and make cellular phone calls.

### Iridium is elementary

**Motorola called its geosynchronous satellite net Iridium because the original design called for 77 satellites to orbit the Earth, and iridium, the element, has 77 electrons rotating about its nucleus. When the network was scaled back to 66 satellites, the firm kept the name Iridium because the element possessing 66 electrons is called dysprosium.**

Sony's Magic Link tries to position itself more simply than Simon. It is the first personal communicator based on General Magic's Magic Cap operating system and implementing the Telescript remote programming language. The user interface is intuitive and entertaining. The home screen depicts a street with buildings. The user can go inside each building and then each room within a building simply by tapping on it. Magic Link is a unique platform for keeping track of appointments, expenses, addresses, telephone numbers and even phone calls. More importantly, users can send and receive E-mail postcards containing text, graphics, sound clips and animation. The unit comes with a built-in fax/data modem and infrared port at a suggested retail price of \$995. Although the first version is somewhat pricey, Magic Link will prove a great tool for keeping in touch.

By now, some of you may be wondering why you should give a hoot about personal communicators. The simple answer is that these are not stand-alone products; they are designed to interact with networks and other devices such as fax machines, desktop PCs and, ultimately, televisions. PDAs do not simply send messages, and the networks they are designed to interact with do

not simply store and forward messages. What is emerging is a new communications shift in which users will send messages that will act on their behalf. AT&T, for example, has built a new network called PersonaLink that it hopes will become an electronic marketplace in which user agents will meet and conduct business with merchant agents.

What we are talking about, in a nutshell, is a new form of commerce. (Hint: This involves money, so it may become important.)

### YOUNG TECHNOLOGIES

In conjunction with other emerging technologies — spread spectrum radio, infrared beams, intelligent voice mail systems, two-way paging and low-earth orbit (LEO) satellites — personal communicators will break out of the chasm and help business users get things done in a time-saving and cost-efficient manner. Put another way, while these devices may embody far-reaching ideas about how we will access data and people, there is a new world of communication technologies growing up around them.

Spread spectrum radio is a technology that will help us maximize the traffic capacity of wireless nets. This not only means more people will be able to use them, but that each user will be able to do more. Spread spectrum will also help the radio industry break out of its narrowband rut, ushering in a plethora of broadband radio services.

This is not to suggest spread spectrum overcomes the laws of physics. The capacity limits of a radio channel are well understood. But the capacity limits of a network that reuses a radio channel throughout a city is another matter. The problem that has plagued radio networks is interference. Spread spectrum suppresses interference, allowing networks to reuse channels over shorter distances. While spread

spectrum can't increase the capacity of a radio channel, it can dramatically increase the capacity of a radio net.

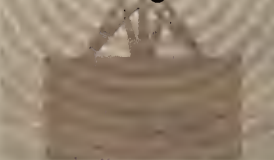
Spread spectrum works by 'spreading' radio signals over a wide frequency band. With Direct Sequence-Spread Spectrum (DS-SS), the signal is spread continuously over the band. With Frequency Hopping

Spread Spectrum (FH-SS), the signal hops rapidly around the band.

Although spread spectrum was originally developed by the U.S. military, the first commercial applications didn't appear until the late '70s: very small aperture terminal satellite nets and commercial Global Positioning System receivers. Thanks to integrated circuit technology, spread spectrum is quickly moving into various business and consumer applications.

One of the most fascinating properties of DS-SS is its ability to support

**Bid high**  
**Narrowband**  
**PCS auctions**  
**netted more**  
**than \$600 million**  
**in winning bids.**





## Wireless Networks

multiple simultaneous users on the same channel — a technique known as Code Division Multiple Access (CDMA). San Diego-based Qualcomm, Inc. has convinced cellular carriers including US WEST, Inc., Sprint Corp. and Ameritech Corp. to standardize on this controversial technology. Because they are able to reuse frequencies in adjacent cells, CDMA cellular nets promise twice the capacity of conventional digital cellular networks.

Spread spectrum is also expected to play a lead role in the new broadband personal communications service (PCS), which many hope will serve as a platform for competing with existing cellular operators and local exchange carriers (LEC).

Competition in the local loop has already started: On the island of Kauai, Hawaii, Ameritech's Cybertel Cellular unit is offering service at 4 1/2 cents per minute. That's less than many customers will pay GTE Corp., the local land-line carrier, under its proposed new pricing.

Another busy market for spread spectrum is unlicensed devices operating in the Industrial, Scientific, Medical bands. These include wireless local-area networks, wireless office phone systems and, most recently, enhanced cordless telephones.

Metricom, Inc. of Los Gatos, Calif., has developed a FH-SS metropolitan-area data network called Ricochet. While nationwide mobile data nets operated by ARDIS Co. and RAM Mobile Data offer users throughputs in the 1,200 to 2,000 bit/sec range, employ arcane protocols and charge by the packet, Ricochet users will pay flat monthly rates for service at speeds up to 77K bit/sec. Microsoft cofounder Paul Allen is one of Metricom's major investors.

A unique feature of Ricochet is its mesh architecture. User data packets hop from one node to the next until they reach the destination node. The nodes sell for approximately \$700 and are small enough to be mounted on utility poles. Coverage can be expanded by merely installing additional nodes. Ricochet represents a breakthrough in infrastructure price/performance when compared to conventional packet radio networks.

But the surprise winner among wireless data solutions may turn out to be infrared. The point-and-shoot variety is inexpensive (\$1.50 to \$4.50 in parts), supports high speeds and consumes little battery power.

Although infrared does not penetrate walls, floors or ceilings, access points can be distributed throughout buildings — perhaps interconnected via wired LANs or phones — to provide ubiquitous indoor service. Since a large percentage of mobile workers (such as business travelers) spend a lot of time indoors, infrared access to the Public Switched Telephone Network could become a legitimate mobile data solution.

Earlier this year, the Infrared Data Association published a worldwide standard for beaming data at speeds up to 115.2K bit/sec. The potential applications for 'walk up' infrared are numerous. PDA users can exchange electronic business cards, download documents to nearby printers or fax servers, dial public telephones or beam credit card information to point-of-sale terminals.

To better understand infrared's potential, imagine if every pay phone were equipped with an integrated infrared port and fax/data dial-up modem. Users arriving at airports could dial their office simply by tapping an icon on the screen of their personal communicator. The phone number and billing information would be downloaded to the phone over an infrared beam. The call would be answered by an intelligent voice mail system that would respond by downloading a text listing of the user's messages — whether voice, fax or E-mail. To return voice calls, the user would simply tap on the message listing. Faxes could be automatically forwarded to the user's hotel or personal communicator. Business cards, catalogs and other frequently used documents could be transmitted on demand. The bottom line: This type of personal communications would save mobile professionals a tremendous amount of time and effort.

#### FAR-OUT SOLUTIONS

Personal communications will also receive a big boost from LEO satellites. When people think of satellite communications, they usually think of large backyard dish antennas. These antennas are used to communicate with geosynchronous satellites 22,000 miles above the Earth. The new LEO satellites will float only a few hundred miles above the Earth; as a result, users will be able to communicate at low to medium speeds using inexpensive, low-power, hand-held terminals.

Geosynchronous satellites orbit the Earth once every 24 hours; the satellite appears fixed in space to observers on the ground. LEO satel-

lites, on the other hand, orbit the Earth several times per day, so they must be deployed in carefully arranged fleets to ensure uninterrupted service. Although there are multiple satellites involved, they are less costly satellites placed in less expensive to reach orbits.

Both big and little LEO satellites are planned. Motorola's Iridium is being positioned as a worldwide cellular telephone network. It will serve remote areas (such as ships at sea), underdeveloped countries (perhaps using solar-powered phone booths) and rural areas in developed countries. Iridium plans to offer both voice and data services by concatenating 2,400 bit/sec channels. But at approximately \$3 per minute, Iridium's service won't be cheap.

Iridium's sophisticated antennas will project cells onto the Earth's service. In this network, cells travel past users rather than the other way around. This simplifies cell hand-offs, which are predictable and will occur about once per minute.

Iridium was spun off from Motorola to attract outside investors; to date, it has raised over \$1 billion. Deployment is expected to begin in 1997. At a cost of billions of dollars, there is justifiable concern whether Iridium can generate enough revenue to turn a profit. The biggest obstacle to Iridium's success, however, may be political. Iridium's management will have to strike deals with government-owned phone companies, ensuring them a piece of the action every time an Iridium user makes a call from within their territory.

Dulles, Va.-based Orbcomm plans to construct a 26-satellite LEO network exclusively for data applications. The firm plans to use VHF and UHF frequencies, enabling smaller, more economical mobile terminals, perhaps costing less than \$100.

Orbcomm sees emergency search and rescue and global paging as its biggest potential markets. Hikers and mountain climbers will carry small terminals that will allow them to signal for help, and in the process, the network will be able to determine their location. (Orbcomm plans to operate a 24-hour, 365-day-a-year customer service center that will notify the proper authorities when an emergency message is received.) Like Iridium, Orbcomm will need to attract a large number of subscribers if it is to

#### PDA's at a glance

Company Product	Apple Computer, Inc. Newton	BellSouth Corp. Simon	Casio Computer Corp. Zoomer	Motorola, Inc. Envoy	Sony Corp. Magic Link
Operating system	Newton	Simon	GEOS	Magic Cap	Magic Cap
Processor	ARM 610	X86	8088	Motorola 68349	Motorola 68349
Size (inches)	1.25 by 4 by 8	1.5 by 2.5 by 8	1 by 4.2 by 6.8	1.2 by 7.5 by 5.7	1.0 by 7.5 by 5.2
Weight (pounds)	1.28	1.1	1	1.7	1.2
Price	\$599	\$899	\$599	\$1,500	\$995
Infrared	✓		✓	✓	✓
Other connectivity	PCMCIA pager, Metricom	PCMCIA pager, cellular, fax/data	PCMCIA pager, RAM Mobile, cellular	PCMCIA pager, ARDIS, fax/data	PCMCIA pager, fax/data

SOURCE: DATACOMM RESEARCH CO., WILMETTE, ILL.

become profitable.

One other proposed LEO satellite system deserves consideration. Teledesic Corp., a joint venture between McCaw Cellular Communications' Chairman Craig McCaw and Microsoft Chairman Bill Gates, was conceived as a worldwide, interactive, multimedia network. Consisting of 840 satellites and to be constructed at an estimated cost of \$9 billion (a figure many critics contend is low), Teledesic will offer data transmission at speeds from 64K to 2M bit/sec. Although the project is still in the preliminary study stage, the service hopes to become operational by the year 2001.

#### FANTASTIC BARGAIN

No doubt to avoid raising the ire of LECs and cable TV operators, Teledesic was proposed as a multimedia solution for rural and remote users. Clearly, Teledesic could upgrade the entire planet's telecommunications infrastructure in one fell swoop. Even at several times the estimated \$9 billion cost, Teledesic would be a fantastic bargain. If allowed to get off the ground, Teledesic could provide LECs and CATV operators with much needed competition in the development of interactive multimedia services.

Users fear wireless communications will leave them nowhere to hide from bosses and telemarketers. Precisely the opposite will occur. Wireless communications will empower users; for the first time, they will have complete control over who can reach them and when.

Mobile communication networks must be capable of identifying, locating and consistently supporting users wherever they happen to appear. Mobile subscriber devices and network services must automatically suspend and resume communications as users drift in and out of

coverage. Not just new features but a new communications etiquette, will evolve. As a result, many users will prefer to use wireless services even from their desktops.

Personal communications will wean us from real-time interactive communications in favor of time-slice communications. We will zap off multimedia messages and intelligent agents. Other users will do the same. We will come to rely on software to filter, reroute and dispose of information. Advertisers will abandon broadcasting in favor of narrowcasting. Surrounded by ever-expanding rivers of information, we will have no choice but to offload our communications to machines.

Just as letter-writing gradually became a lost art after the introduction of the telephone, human conversation will become a lost art (at least in business) as personal communicators show us a quicker, more effective way. We simply won't have the time to personally interact with all the people who will want to communicate with us. Personal communicators and intelligent agents will screen our calls and messages, handle routine queries and even go shopping for us.

But perhaps the biggest benefit of personal communications concerns the highly touted Information Superhighway. Personal communications will help us slip off the highway to explore the information boulevards, side streets and back alleys that will be inhabited by new information brokers. This is where the real action will be. What users need now is not access to more information but the tools that will assist them in obtaining the right information at the right time in the right place.

♦♦ Brodsky is president of Wilmette, Ill.-based Datacomm Research Company, a management consulting firm specializing in emerging wireless technologies. Brodsky's book, *Wireless: The Revolution in Personal Telecommunications*, will be published by Artech House in the first half of 1995. Brodsky can be reached via wireless E-mail at his Internet address: brodsky@radiomail.net.

#### Limited success

Despite its success, cellular telephony has only achieved about a 7% market penetration. New personal communications services could penetrate as much as 50% of U.S. households.





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# The ABCs

Different flavors of PCSs are evolving to meet user needs, but a number of political, technological and implementation issues may affect your adoption plans.



# of PCS



By **CRAIG MATHIAS** and **PETER RYSAVY**

**P**ersonal communications services (PCS) is perhaps the hottest topic in wireless communications today, and with good reason. The promise of PCS ascribes to it far-reaching significance — at the very least, PCS has the potential to radically alter wireless communications, unifying voice, data, facsimile and even some limited forms of multimedia communications under a single, universal, cost-effective umbrella.

But before any of you get too carried away, it should be noted that PCS is not just a single service — there are, in fact, three major flavors of PCS. Nor do standards for wide-area deployment of the technology exist. As is the case with Asynchronous Transfer Mode in the wired world, PCS will pose some potentially major ramifications.

While the ultimate value of PCS is not by any means in doubt, the time scale involved in efforts of this magnitude require careful attention even on the part of network managers who already share the wireless vision. The issue today is that PCS services have yet to make the jump from concept to reality, and there are a number of political, technological and implementation issues that come into play if you're considering PCS as part of your long-term enterprise net strategy.

That means your best bet is to use today's wireless services, isolating applications from specific networks by using mobile middleware, and then migrate to new services, including PCS, where appropriate.

## WHAT IS PCS?

First and foremost, PCS is a frequency allocation, recently codified by the Federal Communications Commission. The FCC is responsible for public use of the electromagnetic airways and, after many years of thought, deliberation, hearings and politicking, the commission reallocated a considerable portion of the electromagnetic spectrum for emerging communications technologies, including PCS. That spectrum will be divided up to support three major categories of PCS service:

■ **Narrowband PCS** has been allocated spectrum at 900 MHz to 901 MHz, 930 MHz to 931 MHz, and 940 MHz to 941 MHz. It is envisioned that this space will be used to offer new services that

## Cellular's slow rise

### 1958

Bell System issues proposal to FCC for 75 MHz in 800-MHz band.

### 1970

Allocation is granted.

### 1971

AT&T Bell Labs submits cellular proposal.

### 1978

Trial system in Chicago.

### 1981

FCC imposes dual-carrier licensing rule.

### Mid-1980s

PCS emerges as new wireless option.

### 1991

Apple proposes creation of new, unlicensed, data-only spectrum.

### 1992

FCC floats initial PCS proposal.

### 1994

U.S. users total 20 million.

SOURCE: FARPOINT GROUP, ASHLAND, MASS.; AND RYSAVY AND ASSOCIATES, SEATTLE

extend the capabilities of current pager (or beeper) technology. Such concepts as wireless voice messaging and two-way or acknowledgment paging have been discussed by suppliers.

■ **Broadband PCS** is what most people think of when PCS is mentioned. This is an allocation of 120 MHz in the 1850-MHz to 1990-MHz band, and represents a considerable amount of spectrum — by comparison, the current U.S. cellular phone system, known as the Advanced Mobile Phone System occupies only 50 MHz.

This type of PCS is widely believed to be the successor to cellular and will likely be used to implement an all-digital integrated voice/data infrastructure. Also possible for this service will be advanced intelligent network functionality, such as the "one person, one number" concept pushed by carriers for some time now.

■ Outside of narrowband and broadband options, there is the unlicensed portion of PCS spectrum. Basically, a 40-MHz block of spectrum has been allocated from 1890 MHz to 1930 MHz. This service is designed to allow unlicensed operation of short-distance (and typically indoor or campus-oriented) wireless voice and data devices, including wireless LANs and wireless private branch exchanges.

These applications today are relegated to the industrial/scientific/medical bands, which are notorious for noise and interference. Unlicensed PCS should, therefore, make better use of the radio spectrum and allow for more simultaneous users and better signal quality.

Thus PCS, encompasses both voice and data over both local and wide areas, with both indoor and outdoor applications. But a big question, of course, is performance. At this point, it seems likely that unlicensed PCS will be able to offer the magic 10M bit/sec for indoor and possibly campus LAN traffic. Narrow-

**There are more than 10,000 cells in the U.S. cellular phone system today. When fully deployed, PCS networks will use more than 100,000 cells across the nation.**

Continued on page 54



## Wireless Networks

Continued from page 53

band and broadband PCS are, however, likely to be limited to speeds common to modems today — 9.6K and 14.4K bit/sec. With compression — and perhaps by combining multiple channels — limited remote LAN access, nominally at ISDN rates, will be possible.

But unlike land lines, wireless bandwidth cannot be guaranteed, meaning that PCS is likely to be most useful in messaging and other applications where bandwidth demands are flexible.

### CURRENT CHALLENGES

The PCS spectrum is currently occupied by a number of incumbents, mostly low-speed, point-to-point data and telemetry systems operated by utilities and local government. Consistent with the FCC's policy of spectrum refarming, whereby the government attempts to make the best possible use of what is one of the most valuable commodities in the universe, the FCC is requiring that current users of these bands relocate to other radio space, with such moves to be paid for by PCS licensees. However, moving incumbents takes time and will cost a significant amount of money, which is a major issue for both broadband and unlicensed PCS.

In the unlicensed area, the FCC has chartered the Unlicensed Transition and Management (UTAM) committee to create proposals for clearing the spectrum as soon as possible. Expert opinion is mixed, however, regarding how successful UTAM will be in meeting its charter. The requirement for significant sums of money and delicate negotiations may take a substantial period of time before the relocation issue can be sufficiently resolved.

Another major issue is a recent change in FCC policy regarding who gets spectrum allocations. Traditionally, the commission used a simple lottery, giving all comers an equal chance to get into the game.

The FCC, however, has now begun auctioning the airwaves, using techniques that are designed to maximize revenue to the government and provide for broad participation in the process.

Coupling the millions of dollars involved in bidding (the recent narrowband auction raised more than \$650 million) with the expense of building out an infrastructure for new communications services results in a major business challenge — and, again, potential delays in realizing the intended service.

A final challenge is the lack of technical standards for the deployment of broadband PCS. Many customers (especially for voice service) are anticipating a single, unified, all-digital network with nationwide roaming — features lacking in current cellular phone service. While systems similar in concept to broadband PCS have been operational for some time else-

where in the world — the Global System for Mobile Communication (GSM) in Europe and the Personal Handy Phone System in Japan — it is unlikely that these implementations will be adopted whole as a basis for PCS in the U.S.

Moreover, there will be as many as six broadband PCS licensees in each market and no guarantee that all will use the same technology. Finally, that Holy Grail of wide-area wireless — universal, seamless roaming — could be complicated since no nationwide licenses will be granted.

Users will have to rely on business alliances among vendors using common technology if such a capability is to exist in PCS.

Also, many broadband PCS systems are designed with a microcellular architecture. This means that, unlike the current cellular telephone system, which has cells typically eight miles apart, PCS cells might be placed every few thousand feet (sometimes less), depending on the size of the local installed base and other factors such as terrain.

As a result, PCS handsets can be smaller, lighter and could have an excellent battery life. The short-distance transmission characteristics of low-power systems should also allow excellent frequency reuse in a given area, providing much more capacity than current cellular systems.

On the downside, it will take some time before carriers can get the necessary permissions from local authorities to conduct a build-out of this magnitude, even though PCS base stations are much smaller and less obtrusive than current cellular systems.

### WHAT TO EXPECT

There is little doubt that the integration of mobile users into corporate data networks improves the productivity of workers on the move. More than ever before, the utility of a mobile computer and the productivity of the mobile computer's user is today a function of the networks to which the computer is connected. Universal wireless data connectivity is a noble goal, and PCS will clearly play a role in expanding the value of data communications. Users and application developers can expect both circuit- and packet-switched data services, although circuit-switched services will predominate initially.

But since broadband PCS is a ways off, network managers needing wireless connectivity today need to consider other alternatives, perhaps with an eye toward migrating at least some of their users to PCS as the technology and its users mature.

Currently, you have a variety of PCS alternatives. Cellular telephony remains the most popular choice, since so many mobile workers

already have cellular phones. Subject to a few constraints, modems can be used with cellular phones for a traditional dial-in capability. And cellular services will behave similar to the broadband PCS offerings that will emerge.

Cellular services aside, packet data services such as those offered by ARDIS Co. and RAM Mobile Data, and Cellular Digital Packet Data (CDPD) offerings, have developed followings. These are data-only offerings well suited to the infrequent, low-volume use typical of messaging and database queries.

Finally, paging in all of its many forms can also be useful, although service is only one-way. Electronic mail-to-paging software packages are available from many mail software and network providers. Paging is extremely useful for broadcast (one-to-many) message distribution, E-mail forwarding and some dispatch applications. Narrowband PCS will most likely add two-way service, acknowledgments and, possibly, voice mail forwarding.

Perhaps of greater concern is how to migrate applications from wired to wireless, and between wireless services, with disparate application program interfaces and protocols.

A variety of approaches are available to developers. Many wireless systems support a wire-line emulation mode using extensions to the popular AT command set common to modems. Alternatively, common networking protocols, such as TCP/IP, can be supported, which is the approach taken by CDPD. Another interesting idea is the use of mobile middleware, software systems that provide a uniform network interface irrespective of the particular wireless (or wired) service being used at any given moment.

Middleware packages are available today that address the needs of both programmers (in developing applications) and end users (extending operating system or network operating system functionality). In each case, the decision about which network to use can be

delayed until runtime, and software can be developed without a detailed knowledge of the interfaces provided by various networks. Net managers can therefore deploy mobile applications knowing that their choice of service provider remains flexible.

Many vendors, including AIRONET Wireless Communications (with FieldNet) and Oracle Corp. (with its recently announced Oracle in Motion package) are offering middleware systems. The right middleware package could provide an easy migration path to PCS when service becomes available.

### The many uses of PCS

#### Narrowband PCS

- ▶ Higher capacity paging networks
- ▶ Acknowledgement paging
- ▶ 2-way messaging
- ▶ Digital voice message delivery

#### Broadband PCS

- ▶ Next-generation cellular networks, voice and data services (cells are similar in size to current AMPS cellular systems)
- ▶ Pedestrian-oriented microcellular networks, voice and data services (high-density usage like in downtown areas, shopping malls and airports)
- ▶ Local-loop replacement (wire line look-alike)

#### Unlicensed PCS

- ▶ Wireless LANs
- ▶ Wireless PBXs for voice services only
- ▶ Wireless PBXs for voice and data services
- ▶ In-building, and campus-area microcellular voice and data networks

### OK — SO WHEN?

It may not make potential customers feel any better, but the history of wireless communications has been one of slow, steady progress. By comparison to cellular, which took years to become established, PCS may be on a relatively fast track. Nonetheless, given the inherent difficulties of wireless, especially involving data communications, potential customers should not be surprised if PCS service is not exactly around the corner.

Annette Bouta, executive director for wireless products at US WEST Communications, Inc. believes "it will be about two years after the broadband auctions are completed before service is commercially available." Rick Baugh, a consultant with C.R. Baugh and Associates, Inc., a PCS consultant actively involved with PCS standardization efforts, says that though excellent progress is being made in establishing broadband PCS standards, "final standards will not be available until mid-1995." And broadband spectrum auctions begin this winter and may not be completed before May or June, meaning it could be the summer of 1997 before the first broadband users take to the airwaves.

In the meantime, a variety of both local- and wide-area wireless products and services are available for both experimentation and deployment — even in mission-critical applications. And if nothing else, the high level of interest — and investment — in PCS should result in some interesting alternatives for network managers as the decade comes to a close.

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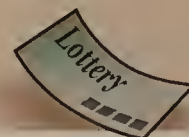
### Make way for PCS

As many as 30,000 incumbent microwave systems must be relocated to a new spectrum in order to make way for PCS.



### Lottery winner

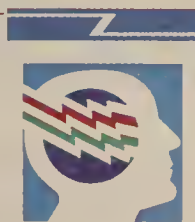
The broadband PCS lottery could raise more than \$10 billion for the government.



### Major anticipated milestones for PCS (Based on a best case scenario)

Major anticipated milestones for PCS (Based on a best case scenario)		Broadband PCS licenses granted	Broadband PCS standards finalized	Unlicensed PCS standards finalized	Initial deployment of narrowband PCS networks	Initial deployment of broadband PCS networks	Availability in major metropolitan areas	Broad availability of PCS systems
Drafts of standards (based on CDMA, TDMA and GSM)	Spectrum auctions begin	Field trials of broadband PCS networks	Unlicensed PCS standards finalized					
Late 1994	Dec. 1994	Early 1995	Mid-1995	Late 1995	Early 1996	1997	1998-1999	





CINDY CHARLES

## Lockheed *cures the procurement blues*

By STAN KOLODZIEJ

**T**he axiom goes, "Timing is everything." It certainly was for Lockheed Missiles & Space Company, Inc. About the time the Palo Alto, Calif.-based defense contractor was feeling shackled by its antiquated procurement process, graduates of a six-month training program at the company's artificial intelligence center were looking for areas to apply their new expertise. For staff engineer Robin Pape, the target was obvious.

Pape, along with fellow scientists Robert Chalmers and William Shirado, combined their talents to develop the Approval System for Automated Procurement (ASAP). The network-based application, which is facilitating the overall reengineering of procurement throughout the company, is currently being used by more than 1,000 Lockheed employees in the San Francisco Bay area.

More importantly, ASAP has helped eliminate procurement errors and has scaled down the procurement process from six weeks to just two days. This innovative object-oriented expert system has won Pape and his colleagues awards from Lockheed and from the Artificial Intelligence Association.

### BOTTLENECK

Within Lockheed's Research Laboratory, materials purchases range from industrial coolant to satellite and rocket parts. Historically, such acquisitions were initiated by a procurement requester (PR), who manually filled out a daunting

request form. PRs were required to complete the form's 104 questions, each littered with cryptic abbreviations and arcane jargon. Sometimes requiring as many as 18 signatures prior to purchase approval, all forms were created in hard copy only and were passed along through internal mail to company buyers. Buyers rejected as many as three-quarters of all submitted forms for being incomplete or incorrectly filled out.

"Scientists and technicians do not want to bother with all the paperwork," Pape says, "and they don't have the temperament and patience for it."

### STEP-BY-STEP

The first step was to put the procurement process on-line and try and eliminate as much of the internal mail and telephone tag as possible. The research and development information systems staff developed Fastbuy, an on-line application that combines electronic mail and database functions to route procurement forms from requesters to corporate buyers. Originally written in COBOL and recently rewritten using C++, Fastbuy enables users to fill out request forms on their computer screens and send them via DECnet directly to the buyers located at various locations in the San Francisco Bay area.

"Now [R&D] had a two-stage process, with requesters dealing directly with the buyers, but we still had that long procurement request form," Pape says.

Lockheed officials watched as their topflight staff of research scientists, tech-

nicians and engineers continued to drown in the 104 separate data fields that made up the request forms.

The Lockheed development team knew that most of the mistakes made during the procurement process could be caught by an expert system that would interact with the PRs, advise the group of inconsistencies or rule violations and suggest appropriate alternatives. Moreover, if the expert system explained its reasoning well enough, fewer of these mistakes would be made in the future.

To develop ASAP, Pape and his team used Smart Elements, an object- and rules-based development environment from Neuron Data, Inc., also in Palo Alto. Pape and his colleagues then wrote some wrap-around ASAP code for processing needs, initially written in C and then in C++. A major factor that led the team to choose Smart Elements was its ability to run on multiple platforms, a necessity with Lockheed R&D's mix of Apple Computer, Inc. Macintoshes, IBM Personal Computers, RISC servers and computer-aided design and manufacturing machines spread over the division's 1,000 potential users.

"It means I can develop ASAP on a Mac and port it to a Sun server if necessary," Pape says.

Together, ASAP and Fastbuy get PRs (that are correct the first time) delivered on-line to a corporate buyer in days instead of weeks. In essence, the Fastbuy system activates ASAP when the requester has completed an on-line input form. At that point, ASAP activates its expert system component, which displays advice for the requester based on the purchasing policies and procedures of Lockheed and the U.S. government. If, for example, the requester has filled in the wrong parts code for an industrial coolant or failed to charge it to "overhead" as a consumable item, ASAP's

expert system would advise the requester of the mistake, explain why it is incorrect and then suggest a correction.

If a conflict exists among data fields on the form and it isn't obvious which fields should be changed, the application provides options but leaves the ultimate decision to the requesters. If requesters choose to override ASAP's advice and send the request form along without suggested changes, the system automatically adds a notation on the form. As the form is automatically routed to the corporate buyers, it includes the note explaining that the requester chose to override ASAP's suggestion.

### PROMISING FUTURE

In addition to slashing processing time to procure new materials from weeks to days, the application has saved nearly \$2 million in labor costs alone in its first year

of operation, according to an audit by the Lockheed R&D's finance division. "ASAP has been so successful that we are now moving it out to other procurement divisions within Lockheed," Pape says.

ASAP is a major component of Lockheed's new central purchasing system called the Procurement On-line Management Information System (PROMIS). The rules in ASAP that are specific to

Lockheed's R&D division are being extended and enhanced in order to meet the wider needs of the company's central procurement operations. Currently under development, PROMIS applications are being written in C++ and will use Sun Microsystems, Inc.'s scalable processor architecture (SPARC) workstations in a client/server network configuration, with requesters in all divisions using IBM PCs and Apple Macintoshes.

**Waste not,  
want not**

**ASAP saved  
Lockheed nearly  
\$2 million  
through cuts in  
labor costs alone  
in its first year of  
operation.**

♦♦ Kolodziej, a Boston-based free-lance writer, may be reached at (617) 863-1436.



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# Letters

## Why no URLs?

Your article, "Mall-hopping on the Internet" (Oct. 10, page 4) touched on a pet peeve of mine. Within the article there is a graphic listing several services offering shop-by-net services. However, for some unexplainable reason, you have included E-mail addresses rather than World-Wide Web Uniform Resource Locators (URL) for these services.

This simply makes no sense, especially for a publication that reports about networks (and the Internet). Whenever you cite a resource that is publicly available on the Internet, you should cite an URL. E-mail addresses should be a fallback only in situations where the URL is not available or is not publicly accessible.

I hope you will consider a policy of always including URLs in the future. Also, E-mail addresses for each writer would be handy.

Avi Harris Baumstein  
Computer programmer  
Florida Department of Citrus  
Gainesville, Fla.

NW Senior Writer Adam Gaffin replies:  
NW's policy is to try to give readers ways to get more information about the topics we write

## Help desk

Continued from page 2

management (like documenting connections).

The EIA documents are titled Commercial Building Telecommunications Wiring Standard (EIA/TIA-568); Technical Systems Bulletin Additional Cable Specifications for Unshielded Twisted Pair Cables (TSB-36); Additional Transmission Specifications for Unshielded Twisted Pair Connecting Hardware (TSB-40); Commercial Building Standard for Telecommunications Pathways and Spaces (EIA/TIA-569); Residential/Light Commercial Telecommunications Wiring Standard (EIA/TIA-570); and Administration Standard for Telecommunications Infrastructure of Commercial Building (EIA/TIA-606). To

about, typically through phone numbers or E-mail addresses for the companies mentioned in our stories. But in a story about on-line malls, it certainly would have made sense to provide their URLs so that readers could check them out for themselves. For the record, here are the URLs for the malls we mentioned:

The Branch Mall — <http://www.branch.com>  
CommerceNet — <http://www.commerce.net>  
Marketplace.com — <http://marketplace.com>  
MecklerWeb — <http://www.mecklerweb.com>  
The Digital WebMall (Mall of the Universe) — <http://www.service.digital.com>.

Regarding E-mail addresses for writers and editors, we plan to add that information soon. Stay tuned.

## Premature eulogy

Thanks for your gallant effort to stall the movement of LAN-based desktop videoconferencing. Did you have the same eulogy for the X Window System when it first appeared? After all, it's now a mainstream networking application used throughout the world.

In your research, perhaps you were unable to talk with Cisco Systems, Inc. and Wellfleet Communications, Inc., just to mention a few vendors, about their perceptions and product development plans for real-time applications. Otherwise, you may have discovered their adoption of new and emerging bandwidth reservation schemes and quality-of-service architectures like IETF RFC 1190 for Streaming Version II (ST-II) or the draft RFC called Resource

obtain these documents, call Global Engineering Documents at (800) 854-7179.

You could also check the documentation supplied by the vendor of the wiring system and products you are using.

A number of manufacturers that comply with EIA/TIA-568, like AT&T and Anixter Bros., include a three- to five-page summary in their sales catalogs of plug pin-outs, wire color codes and other relevant information. These standards are simpler and less complete than the EIA documents.

Federal, state and local electrical, building and fire codes also have an impact on telecommunications wiring — for example, they prohibit PVC (plastic jacket) cable in plenums, which can generate poisonous gases when exposed to heat or flame. Contact your local electrical inspector for guidelines concerning

Reservation Protocol (RSVP) codeveloped at the Xerox Palo Alto Research Center.

It's interesting that you suggest such a doomsday attitude toward packet-based desktop videoconferencing and yet give preference to collaborative whiteboard and application sharing. Do you think that widespread adoption of applications such as these are not going to add the bandwidth consumption requirements throughout the industry? Of course they are, and most LANs and WANs are in a transition period of evolution. Just two years ago, IS planners would have limited their bandwidth horizons to just 10M bit/sec per PC, and yet now, with the advent of fast Ethernet and ATM, it's very likely that we'll see a minimum of 25M bit/sec at each desktop.

James Geddes  
Chairman  
InVision Systems Corp.  
Vienna, Va.

## Common question

The title to your editorial "Who needs LAN-based video?" (Oct. 17, page 50) is a question I've been asking for a long time. And the answer you provided is the same conclusion I've reached. It's nice to see someone looking past all the hype.

Tim Gales  
Manager, network and system administration  
Empros Power Systems Control Division  
Siemens Energy & Automation, Inc.  
Plymouth, Minn.

these matters.

Although the voltages and currents normally carried in network wiring are minimal, all electrical wiring should be considered dangerous and treated as such. If you are unsure of how to go about the wiring project, consult a licensed electrician.

### OBTAINING THE UUENCODE/ UUECODE PROGRAM

In our Oct. 24 Help Desk, we briefly described how the uuencode/uudecode program is used to translate binary files to ASCII format for transmission on the Internet.

Readers can download the uuencode/uudecode program from the Internet by using Gopher to connect to mundo.eco.utexas.edu and then selecting the Software option from the menu. ☐

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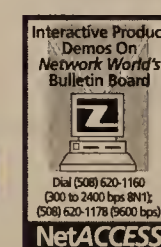
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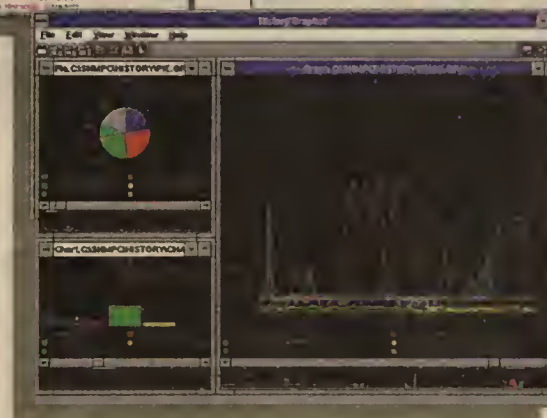
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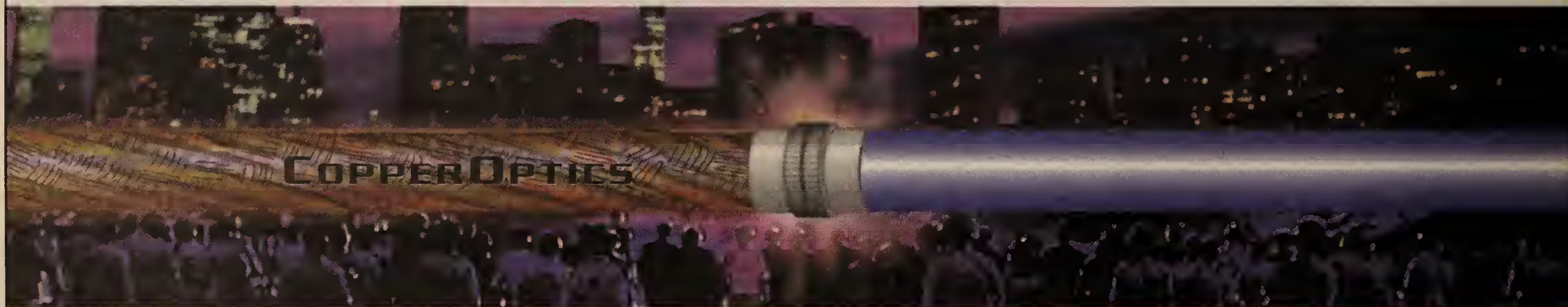
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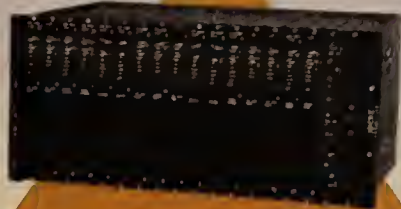
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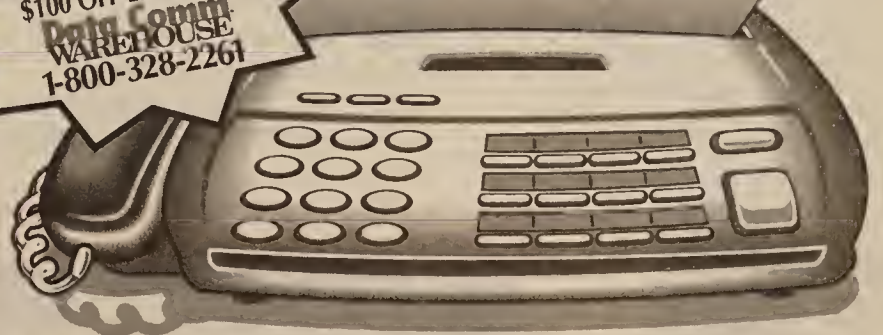
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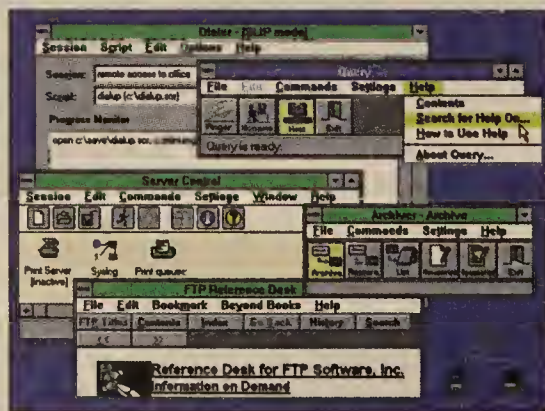
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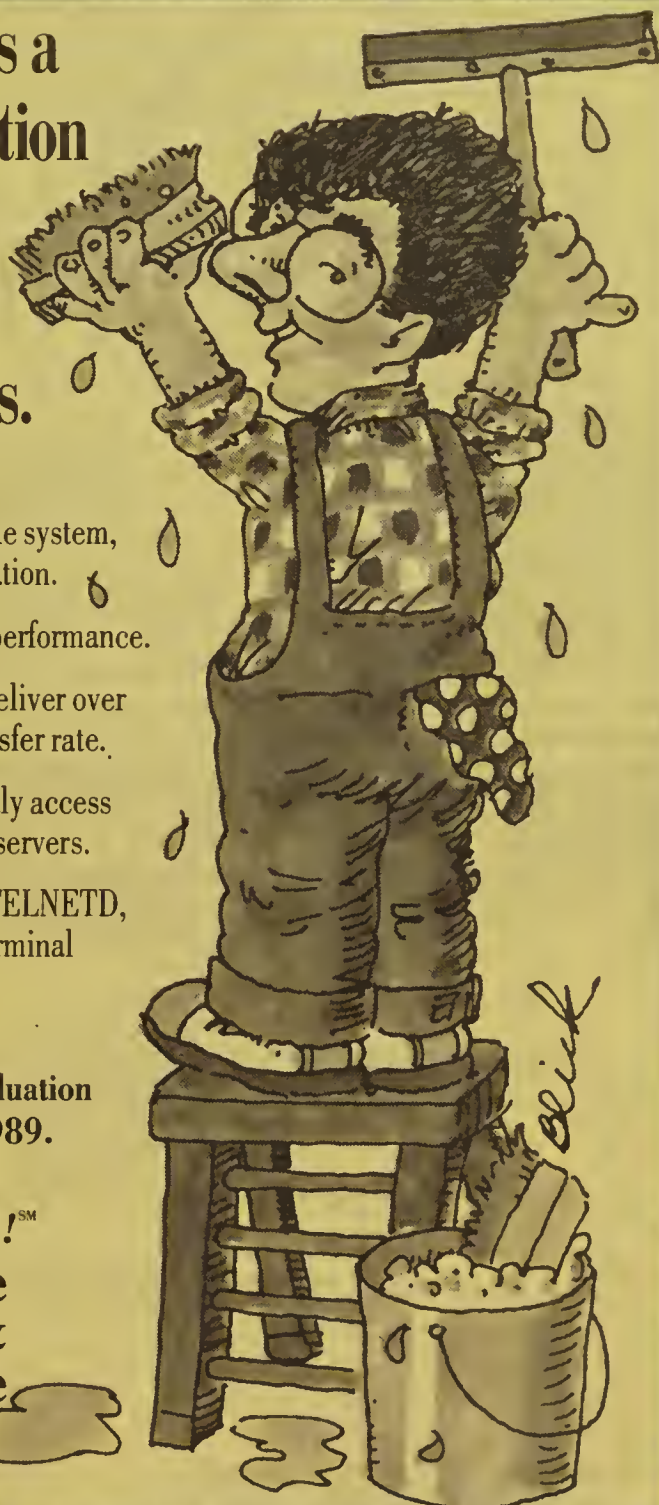
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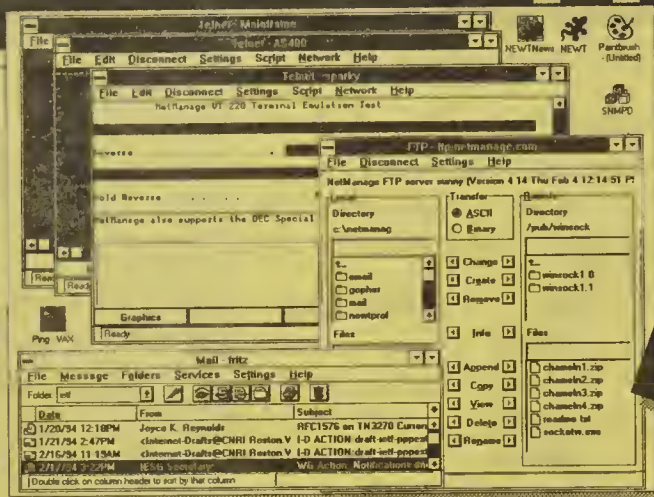


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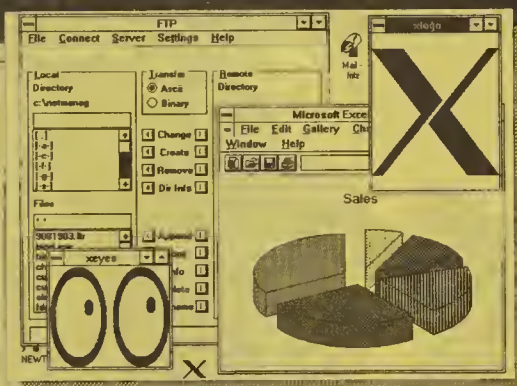
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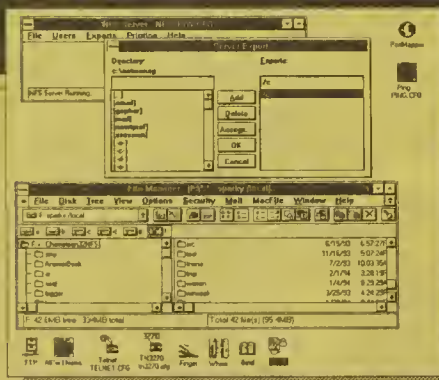
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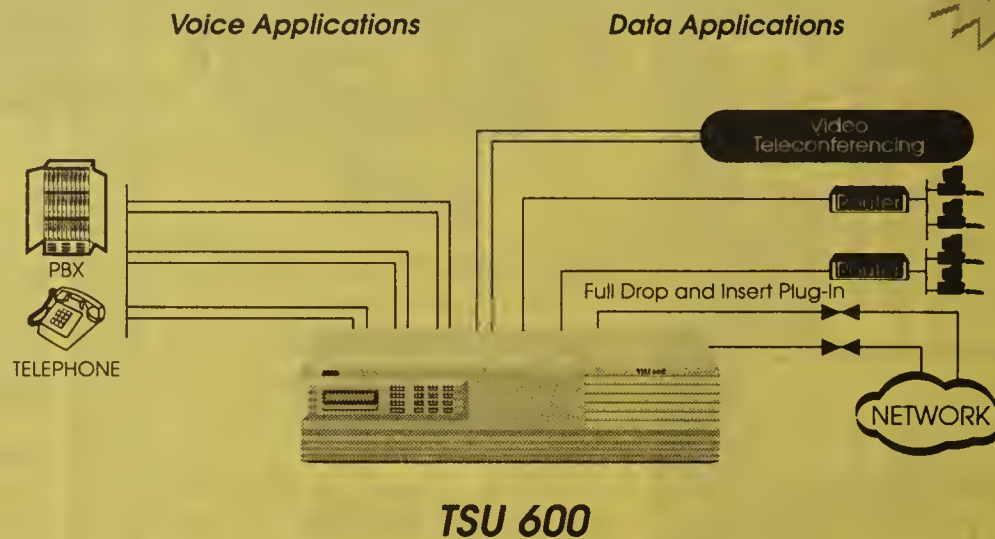
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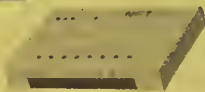
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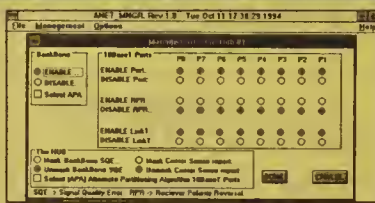
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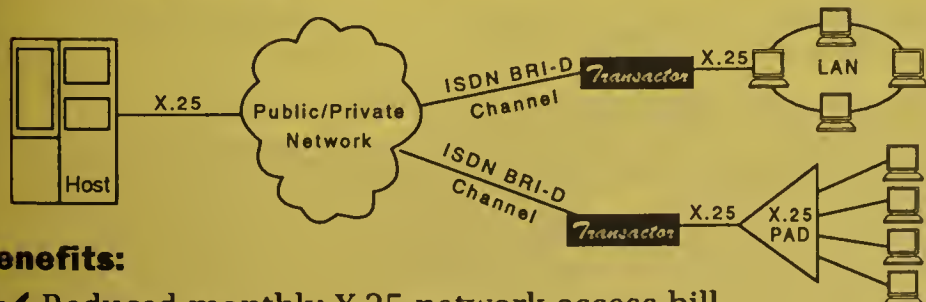
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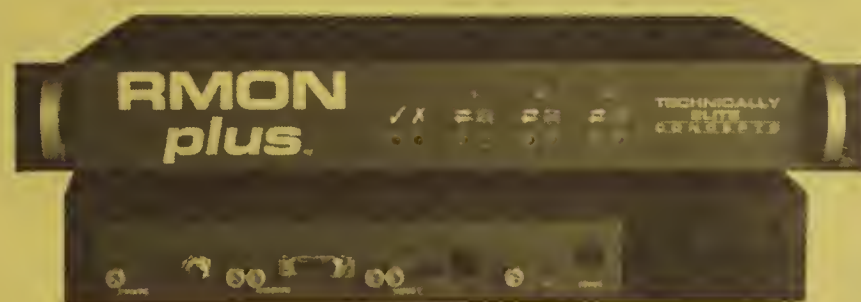
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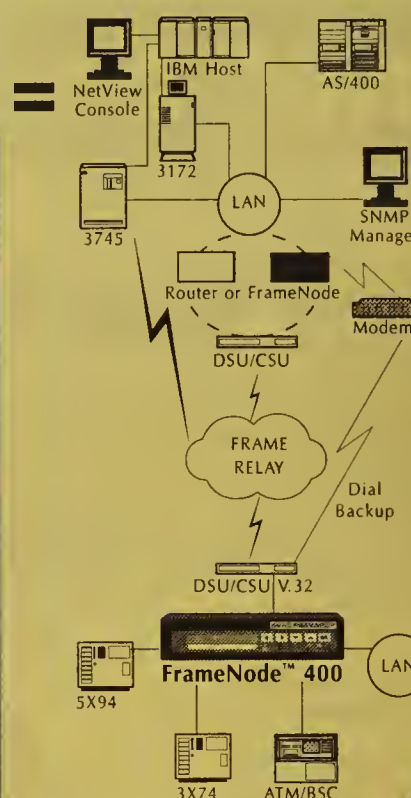


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# Cisco

Continued from page 1

According to analysts briefed by the company, DLS+ will build on Cisco's RSRB architecture, which includes Cisco extensions for flow control, prioritization and custom queuing.

DLS+ also includes a feature called peer groups. Peer groups are designed to decrease the amount of explorer frame broadcast traffic on the network because source route bridging routers will not have to broadcast these packets to all routers across the network. Instead, they broadcast to a smaller designated group of peer routers.

When an access router needs to locate a path to an end station on another LAN segment or subnet, it will broadcast an explorer frame to its peer border router. That router will then locate the end station and find as many as four paths through the network the sending station can use.

DLS+ will be available as part of Cisco's Internetwork Operating System software in the first half of 1995, analysts said.

Pricing could not be learned by press time.

Cisco will also announce a technology called Native Client Interface Architecture (NCIA), the company's answer to TN3270. NCIA is client software that allows users to retain their SNA client interfaces while accessing IBM hosts over IP backbones.

NCIA converts 3270 data streams to IP packets at the client so there's no overhead associated with converting at the first router hop, analysts said. Wall Data, Inc. is also expected to announce this week that it will support NCIA in its Rhumba software, which provides Windows-based personal computers with access to IBM hosts.

Wall Data declined to comment.

NCIA will be available in the first half of 1995.

"Cisco is extending its expertise and brand name out to users left out in the cold by IBM," said an analyst who requested anonymity.

Meanwhile, Cisco's new FRAD will have an integrated Ethernet or token-ring interface and two serial ports: one for frame relay and the other for IBM Synchronous Data Link Control traffic. Through a software upgrade, the FRAD can attain all of the multiprotocol routing capabilities of the 2500, analysts said.

The FRAD will also be available in the first half of 1995. Pricing could not be learned by press time.

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# RAM

Continued from page 1

Rockwell International's RC32ACM Mobitex chipset — also to be announced at the show — combines Mobitex, fax and telephone protocols, according to Martin Levetin, senior vice president of strategic planning and technology at RAM Mobile.

RAM Mobile and the OEM card vendors' goal is to get PC makers to bundle cards into portable computers and spur RAM Mobile network usage. Last week, Mobitex modem maker Ericsson GE announced a Mobitex PCMCIA card that will ship in hand-held industrial computers from Norand Corp.

RAM Mobile is pushing to get better, lighter and less expensive RAM modems into the hands of users. "If a modem weighs 1 pound and costs \$800, it's not convenient enough for the average user," Levetin said.

Users agreed. "That is a major breakthrough for RAM," said Githesh Ramamurthy, executive vice president of product engineering at CCC Information Services, Inc., a Chicago-based firm providing mobile computing and other systems and network services to the insurance claims industry. "I've told them that until you can shrink the modem form factor, mobile computing is just a big pain."

Some users have been awaiting internal modem cards so they do not have to juggle different devices and worry about the separate battery lives of their PC and modem. However, others said they would rather have removable cards that can be swapped out for interfaces to other wireless networks to accommodate coverage gaps and to allow them to adjust their equipment to different modem and PC product life cycles.

In addition to trying to scatter the Mobitex protocol throughout the industry, Levetin said RAM Mobile

will expand its network coverage over the next three years by installing another 500 base stations across the country. The move should beef up coverage breadth and in-building penetration.

All of these efforts are an attempt to leverage the lull before CDPD's ramp-up, analysts said.

"They're doing what they should be doing, which is capitalizing on CDPD running late and building a good solid customer base," said Iain Gillott, manager of wireless communications at Link Resources Corp. in Framingham, Mass. RAM Mobile has about 17,000 subscribers today, including recently signed contracts with Kodak Corp. and Unisys Corp.

"But if you look at the size of the firm and its investment, compared with that of CDPD, it's a bit of an uphill battle," Gillott said. "Why do you need RAM or ARDIS when you have 60 firms behind CDPD?"

Because "CDPD will die," said Gerhard Blendstrup, senior vice president of strategic services at ADP Automotive Claims Services in San Ramon, Calif.

Though ADP has tested both the RAM Mobile and ARDIS Co. networks for its portable claims application, PenPro, it has reverted back for the time being to circuit-switched cellular for the wireless alternative because of insufficient coverage of either network.

"RAM and ARDIS as technologies are much more pure than CDPD; they each are one nationwide network. They don't force you to rely on local operators accustomed to voice applications," Blendstrup said.

Blendstrup added that he is also concerned that there are no trials of very large data applications across CDPD going on ahead of commercial deployment. ■

## Comments?

See "How to reach us" on the back page.

## NETWORK WORLD

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## Reliability

Continued from page 1

upgrades to newer technology wherever the network shows stress.

"You feel very much like a bridge painter supporting these trading floors," said Bill Schimoler, Chase's vice president of trading technology.

Indeed, this is not Chase's first major networking effort.

"Two years ago, we were not viewed as major competition by any of the leaders in our markets," Baranovic said. At that time, the company started deploying client/server trading applications that now underlie its business.

Chase is now rated the foremost foreign exchange bank in Europe, a key bond trader in New York and one of the top derivatives traders worldwide. "I'm not saying that technology alone did this, but [this position] would have been impossible to achieve without the technology behind it," Baranovic said.

But the company's 5-year-old Ethernet LAN is not powerful enough to support increasing business volume, leaving traders to sometimes track and share information manually. So Chase decided last year to rebuild its New York trading facilities.

### THREE'S A CHARM

It's not one network, actually, but three. Chase is deploying three separate Ethernet links to all trading desks, which hold a Sun Microsystems, Inc. workstation and a personal computer.

The PCs are connected to their own network handling basic office applications on a NetWare LAN. Each Sun workstation is attached to two separate fiber-based 10M bit/sec Ethernet segments. One supports exter-

nal market data feeds, while the other supports Unix-based trading applications.

The market data feed requires multicasting to each desk, while the trading applications demand point-to-point performance.

"Rather than compromise, we felt it was better to separate them," Schimoler said.

Consequently, each trading desk is served by three hubs, each handling one of the Ethernet segments. The hubs, in turn, attach to a Cisco 7000 backbone router. This router then connects to an FDDI backbone anchored by more Lattis System 5000 hubs.

Every fiber link and piece of equipment is configured to reduce the hazards of a failure anywhere. "No two adjacent desks share anything in common except the air in the room," Schimoler said.

"It's to the point where if one chassis fails, there are enough unused cards already installed on another chassis next to it to support the traffic," he said. Backup happens automatically through SynOptics' and Cisco's network management tools.

Schimoler estimates that the overall network configuration costs about two to four times the cost of conventional Ethernet deployment. But the payoff is ultimate reliability. "The worst that can happen is that a trader would have to share his neighbor's desk," if a workstation or PC died.

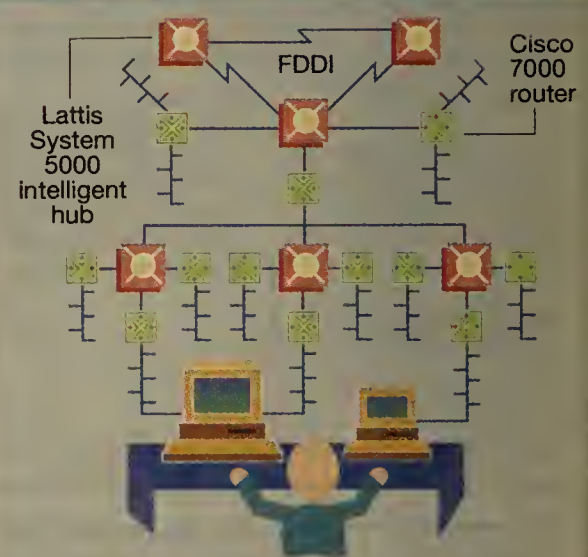
Simplified administration is another benefit. The trading floor requires at least 50 moves, adds and changes a month, which will be easy to handle on SynOptics' Optivity management system. The SynOptics system and Cisco's CiscoWorks also automate much of the network monitoring and restoration functions required for mission-critical uptime.

And now individual segments can be upgraded as needed, without requiring another full-scale change.

### BORN IN A MANGER

To ensure it got it right, Chase built the entire net in a Long Island warehouse, configuring and testing each element before dismantling the works and shipping it to Manhattan.

### Chase gets traders connected



A PC and workstation on each trader's desk is linked to Chase Manhattan's backbone by 3 separate Ethernet links, providing reliable performance and a high degree of fault tolerance.

GRAPHIC BY TERRI MITCHELL

At the warehouse, all the components were set on long, 12-foot-high shelves accessible in the front and back. "This saved us a lot of time because the only thing easily accessible at the trading desks [are] the keyboard and the screen," Schimoler said.

The New York deployment will serve as a model for upgrades to Chase's trading floors in London, Hong Kong and other global posts. ■



# Back to Reality

OSF spins another Web; wireless data makes another push.

BY DAVID J. BUEGER

One of the things I admire most about the computer networking industry is its pragmatism. Much of the world runs on politics first, with results that (maybe) follow. In the networking world, vendors can play politics if they want but get their butts kicked if the products don't work.

This context aptly frames the Keystone Cops-like antics of the United Nations of our industry, otherwise known as the Open Software Foundation, Inc.

The OSF was chartered in 1988 by the industry's elite vendors and now claims more than 400 member organizations. Its grand vision included a scheme called the Distributed Computing Environment (DCE), intended to usher in the golden age of client/server computing.

Few would question that DCE is an unmitigated flop. Its most ardent user supporters still complain about the lack of development tools, systems management and third-party applications. What that means in English is you can't do a damn practical thing with DCE.

Somehow, I am not surprised. Most grand visions end up in a tailspin because it's impossible to get everyone to agree on everything — especially cutthroat competitors.

This failure isn't due to users poohpooing the premise of DCE. It's a lot like the U.N.'s goals of world peace, a clean environment, ethnic unity and redistributed income for all. Rich Country A to Poor Country B: "I'm glad we're on the same track, but would you please aim that SCUD missile somewhere else?"

The OSF is now shipping DCE Version 1.1. Hurrah. Now we're one-tenth of a step closer to OSF's promises of single-user logons and "fine-grained" security. But before you snuggle in for a safe night's sleep, consider the OSF's newest pitch: to integrate DCE with the World-Wide Web (WWW).

The WWW is a sexy target — its multimedia aura is appealing to everyone from the *Sesame Street* generation. The fact that you can pronounce "Secretary General Boutros Boutros-Ghali" 10 times faster than you can browse one WWW server screen is a nit-picking detail that doesn't deter marketeers who've spent their 1995 publicity budget on allying with this fledgling marvel of electronic commerce.

The real question is, what does the OSF's intention mean for users? Probably nothing for at least five years.

Well, maybe that's an exaggeration. Seriously, the OSF is just another of a slew of vendors that are developing software for WWW servers and clients. Ordinarily, you'd think this competition portends good things for users. But it's not that simple.

The Internet, on which the WWW is but one application, is a funny beast. No one really controls it, so in one sense, it's a mine field of anarchy. On the other hand, its users and operators spend a lot of time talking to one another to figure

out cooperative methods to make it work.

The mechanism for this technical cooperation is the Internet Engineering Task Force. In U.N. parlance, the IETF is a "nongovernmental organization." That means it has peon status and should be ignored at all cost.

And that's exactly what the OSF and other enterprising vendors are doing. There are no pending Internet Requests for Comment or Internet Drafts that even spell out the challenges of WWW security to underpin electronic commerce.

This lack of open coordination will likely produce a major Internet milestone: the first noninteroperable killer application. Let's hold a party next year to celebrate vendors' ongoing success at screwing up another promising idea.

## Wireless nirvana

Speaking of promising ideas, how many of you have joined the "Unplugged Generation" and shifted to wireless data networking?

Judging from the numbers, not many. RAM Mobile Data now claims more than 17,000 users of its 8K bit/sec two-way radio network. ARDIS Co. claims over 36,000 users for its 19.2K bit/sec two-way radio network. And McCaw Cellular Communications, Inc. doesn't claim any users of its 19.2K bit/sec Cellular

Digital Packet Data network.

Actually, McCaw was embarrassed to admit how few users it has and referred me to an analyst for that number. Nothing like passing the buck.

What's going on here? Wireless was supposed to be the killer networking technology that would serve untethered freedom and new opportunity. Ven-

dors are spending billions of dollars on wireless infrastructures. RAM alone claims to cover 90% of the U.S. urban population. The minuscule number of users isn't even a blip on the chart.

Cost to use wireless is one factor. Another less obvious bugaboo is a lack of applications. Third-party developers, in particular, have faced a big roadblock: Each wireless network requires different access technology and software interfaces.

RAM hopes to whip this roadblock at Comdex with new software that allows developers to write applications that can use any wireless network. Why didn't someone think of this before?

It looks like wireless vendors are finally starting to come back to reality. They'd better — dreams may drive progress, but cash flow pays the bills.

♦♦ Bueger is an industry consultant and contributing editor to *Network World*. E-mail your reactions to [dbueger@pipeline.com](mailto:dbueger@pipeline.com).



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## CyberSpeak

*Voices from the reader network*

**Sprint Corp. has grabbed a stake in the local exchange market, something all the big long-haul carriers are doing. Is this a healthy trend?**

♦ "The more competition that can be brought into the local exchange market, the more likely it is that users will see access costs reduced dramatically. In today's environment, access on a long-haul circuit is oftentimes more than half of the cost of the circuit. There's a great deal of competition in the interexchange arena, and it's driven rates down dramatically."

**George Mattingly, senior vice president, First Union Corp., Charlotte, N.C.**

♦ "It's a healthy trend to allow [big long-haul carriers] to get into the local

exchange market. But in order to make a level playing field, the RBHCs also have to be able to compete to provide interstate services, which they are now not permitted to do. They should be able to go into this business to give the AT&Ts, the MCIs and the Sprints a run for their money on their turf."

**Al Bieber, board member, Communications Managers Association, New York**

♦ "Why should access to the local telephone exchanges be any different from the long-distance exchanges? The long-distance carriers have already

made the separation between offering services and offering wires. This division of services in the local sector should greatly lower local telephone rates. Long-distance rates will also go down as local access fees for long-distance calls come down.

"The only potential problem with competition in the local market is that poor, low-density and hard-to-reach places may get ignored in much the same way airlines ignored small cities when deregulation went into effect."

**Thane Terrill, network administrator, Baha'i International Community, New York**

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